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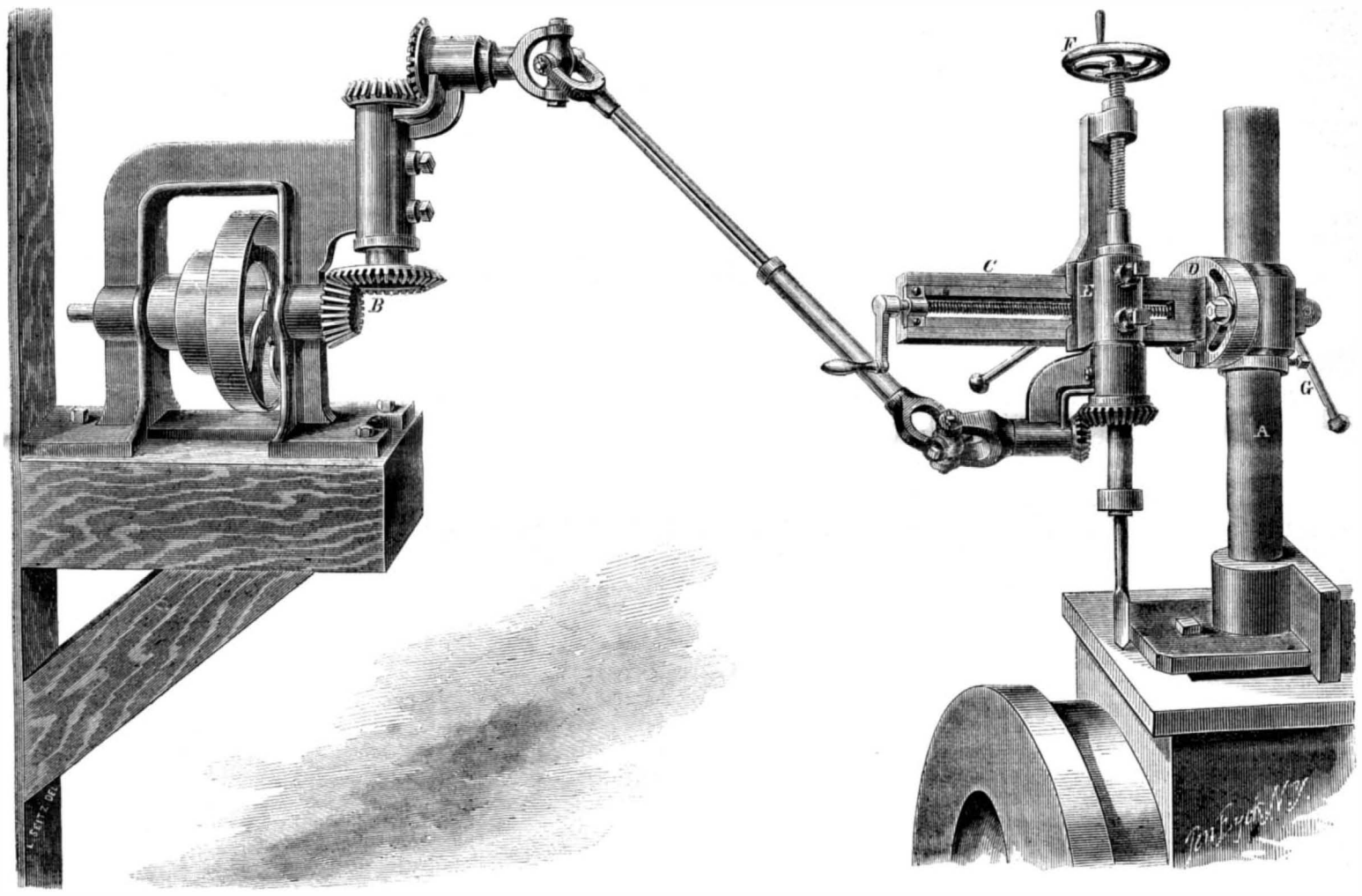
Improved Drilling Machine.

The use of pawl wrenches, for drilling holes, has in a great measure been superseded in the shop by this machine. By the simple adoption of a universal joint, and tumbling shaft, between the drilling crab, A, and the driving gears, B, a rotary motion is imparted to the drill, and the crab is converted into a portable drilling machine, which is light, strong, and efficient. The crab can be carried anywhere, and fastened either horizontally or vertically, as shown, and the arm, C, has a circular slotted head, D, which permits it to be turned at any angle, while the crab remains upright. This is a most useful feature, as it is difficult to fasten a heavy crab to drill a hole at the proper angle. The head, E, is moved along the arm by a screw, which allows the drill to be set with great accuracy, and prevents careless workmen from bruising and breaking the end of the arm, as is frequently done. The drill is fed down vertically by the hand wheel, F. The driving pulleys are shown set on a bracket, for convenience, but they may be placed anywhere; on the floor, or up against the ceiling; in any of these positions they will work quite as well.

For drilling heavy bed-plates, air-pumps, cylinder nozzles, surface condensers, steam chests, etc., this machine is indispensable, and the crabs are often bolted down on a vice bench and used as drilling machines when the fixed machines are in use. The handle, G, secures the arm at the proper hight. This machine is in general use in all of our large machine shops in this city, and is much liked. It was patented on Feb. 9, 1864, by Isaac S. Lauback, of New York city; for further information address Henry Miller, general agent, Box 3,354, New York.



LAUBACK'S DRILLING MACHINE.

Carbonization of Illuminating Gas.

The London *Artizan* says:—"The advantages resulting to gas consumers from the carburization of the gas supplied by the companies has now become generally recognized, and the apparatus for effecting the thorough mixture of the benzole or naptha vapor with the gas has now been so simplified, that whatever objections may formerly have existed have been entirely removed, so that it may be hoped Dr. Knapp's observation, as to the discovery being of benefit to individuals only, will no longer apply. Referring to napthalized gas (as it may here be mentioned that the carburization is always effected with mineral naptha, benzole, or some other material not widely different from them), Dr. Knapp, in his well-known 'Technology,' observed that 'the illuminating power of gas is very much increased by the presence of volatile hydrocarbons, and many years ago Mr. Lowe introduced, or rather proposed, a plan for saturating inferior qualities, or ordinary coal gas, with naphtha, or the spirit distilled from coal-tar, and thus augmenting its illuminating power nearly one-half. The remarkable increase of light, however, produced by naphthalized gas frightened the gas companies, who forsaw nothing but ruin in the diminished quantity of gas which would necessarily be consumed for the production of an equal amount of light. Cold water was consequently thrown upon the project, and the invention has only been of benefit to individuals, and not to the public at large, which might have been the case had it been introduced upon a large scale.' Since this opinion was expressed other inventors have been more successful than Mr. Lowe, and there is no reason why the benefits of a rich, pure, and economical light should not be generally diffused. We have examined the improved carbonizer, known as Woodward's Patent Gas Improver and Carbonizer, and the results produced are certainly all that could be desired. In this apparatus the gas is made to pass over the surface of benzole or mineral naphtha, receiving its vapor and obtaining a vastly increased illuminating power. It is claimed that in passing over the surface of the fluid the gas comes into contact only with the amount necessary for its purification, so that the vitality of the spirit is retained until it is all consumed. Dr. Muspratt has reported very favorably upon the invention, and photometric experiments have proved that, taking gas at 4s. 6d. per 1,000 cubic feet, there is a saving of more than one-third, the same amount of light being obtained for 2s. 11d. The apparatus is at present in use in some hundred manufactories, printing offices, etc., and a large number of testimonials of its efficiency have been obtained."

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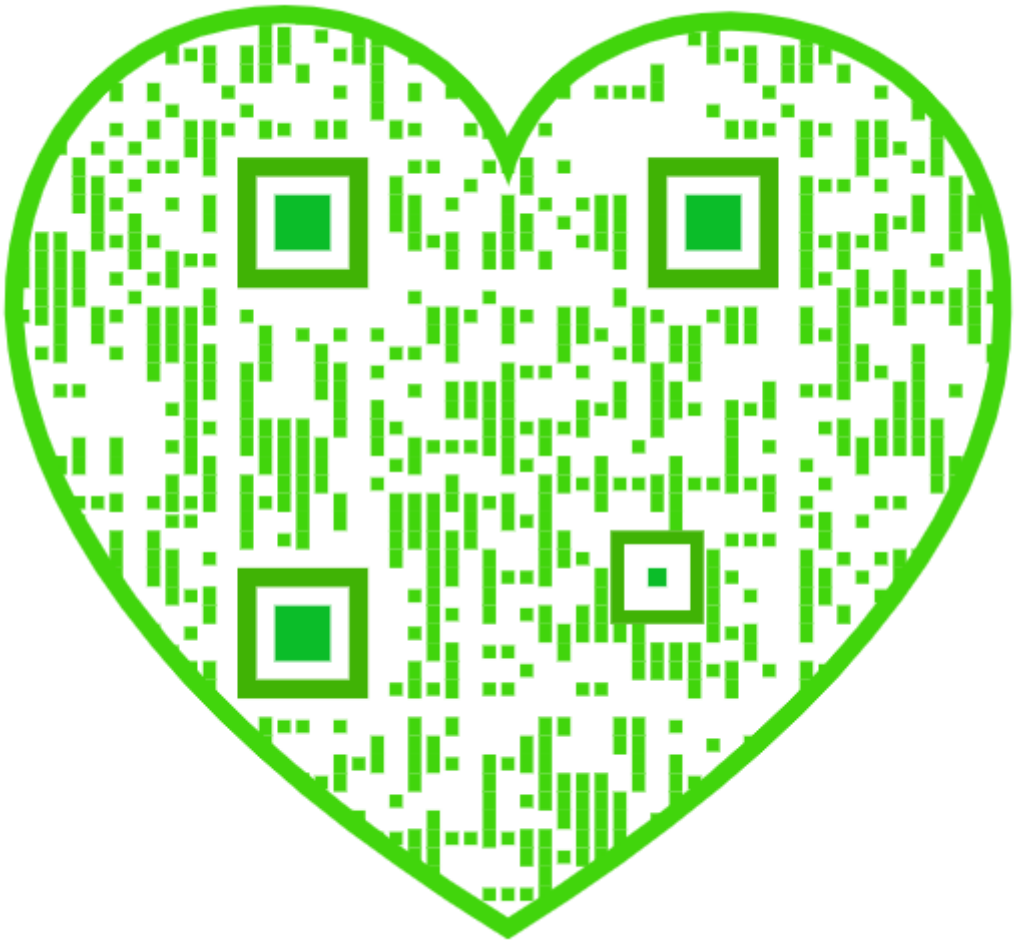

DONALD McKAY'S DEFENSE OF THE NAVY.

We take pleasure in publishing Mr. Donald McKay's letter upon the Navy. The statements contained therein are interesting, and as a compilation of facts will prove valuable for future reference. We concur in Mr. McKay's opinions, and have expressed the same views in the SCIENTIFIC AMERICAN since the war began:—

During my sojourn in England, before the commencement of the war, I was permitted to inspect all the Royal Dock-yards, and all the principal private ship-building establishments in the kingdom, and communicated, in a condensed form, the result of my observations to the *Commercial Bulletin*, and other papers. From England I proceeded to France, where every facility was afforded me to examine the dock-yards of the empire. In the navies of these great powers I saw much that was new, and much that I thought might be copied with advantage by our own Navy Department, and opened communication with some of its officers. My suggestions were always received with marked consideration, and some of them were adopted. When war was upon us, my interest in our navy was increased, I knew the strength of England and France upon the ocean, and the respect which that strength elicited from other nations, and with many others came frequently before the public with a view of developing our own naval resources. I saw that these powers respected nothing but force, and knew that if we desired to prevent foreign intervention in our affairs, our navy must be largely increased I refer to these facts at this time to show that when I write of naval affairs, I write of that which I know, and which will stand the test of fair-minded scrutiny. At the breaking out of the rebellion the navy of the United States consisted of 25 steamers. Such was the steam navy with which the administration began the task of rigorously blockading 3,600 miles of the most difficult coast in the world, against the fastest and best steamers that the shops of England could produce, built exclusively for speed and blockade running at the particular localities; in addition to which the oceans of the world were to be kept free of the steamers called confederate cruisers, but which were in reality English pirates, being built in England. equipped with English guns, and manned by English crews, whose purpose was not to fight our cruisers as war vessels, but to plunder our sailing merchant ships, and to keep out of the paths of our war steamers. With the enormous advantage of having all the ports of the world, except those of the country they pretended to belong to, open to them for coaling, repair, refuge when closely pursued, and sale of the most valuable and less bulky portion of their plunder; and with the sympathy and active cooperation of the officials of those ports; and with the strong incentive of the free plunder of a large, rich, and defenceless commerce, without the slightest personal danger, even if captured, it is indeed miraculous they should have been able to do us the little injury they have.

NO TOOLS TO WORK WITH.

The means at the command of the administration for building a steam navy to achieve the herculean task just indicated, were about two dozen machine shops, great and small, distributed from Maine to Maryland, many of them very small, and without the tools, workmen, or skill requisite for the production of marine machinery. The first-class shops did not exceed eight in number. But the entire force of those shops could not be commanded by the Navy Department for the construction of new machinery. There were the enormous quantity of repairs to the merchant steamers of the country to be done, and new construction to be made for that service. The War Department also drew largely on their resources for transport steamers, while the locomotive and tool-making shops found it utterly impossible to meet the demand upon them. Neither was there sufficient raw material in the country for the large and sudden demand; the iron, copper, tin, and coal had to be mined and manufactured. Hundreds of steamers, hundreds of locomotives, shops full of tools, tens of thousands of tuns of metal were called for instantly, and there was nothing on hand to answer the call. War steamers cannot be built in a day, Inexperienced labor cannot be converted into skilled mechanics in a day; the prices of machinery rose immensely, the pay of mechanics and the cost of material reached a point far above what they were worth except from the factitious cause of the suddenness of the demand. The result was felt in the poor materials and poorer workmanship with which the machinery was made. Any kind of material and the most unskilled labor had to be brought into use, and all this time the amount of even that labor was constantly diminishing by the absorption of men into the military service.

WHAT WAS DONE IN THIS STRAIT.

In this pressing emergency the Department did all that could possibly be done. It purchased every merchant steamer that could be converted into a blockading vessel or a war cruiser, and the navy at this moment contains every merchant steamer of any size or excellence that has been built in the country. It set at work every steam engine factory in the land, that could produce marine machinery. It considered all plans offered for armoring vessels, and tried many. It instituted experiments in machinery, in ordnance, and in armor-plating. It rapidly covered the Mississippi and its tributary waters with an immense inland fleet, many of which were armored, and which sweeping the rebels from these waters, have been an indispensable element to our holding the whole interior of the country, as it gives us the exclusive command of its water highways. It lined the Atlantic coast with such a blockading fleet as the world never witnessed before, and has practically closed the rebellious district to the world, the few vessels which succeed in running the blockade being too small to carry cargo sufficient to give aid of any consequence. The rebels have not been able to import even drugs enough to supply the medical department of their army. The coast around the port of Wilmington, which is the only one at which blockade running is practicable, is peculiarly favorable for that purpose, and is lined for miles on each side with batteries which protect the blockade runners and keep our cruisers at a distance. These runners are small vessels of light draught, and very low decks. They are painted lead color, and approach the coast in the night From the moment it is possible to discover them until they reach the protection of the batteries is a time of minutes, not of hours, and they owe to that their occasional success. Were the circumstances such that they could not reach the port until after a chase of a few hours, their escapes would be very rare. Nearly all that have been chased in this manner at sea have been caught; it is not the speed of the blockade runners, but the conditions of the blockading service that gives them an occasional success. Their fastest and newest steamers, built principally for speed, have been captured by our sloops in fair chase, and the speed of the vaunted *Alabama* is now known to have been greatly exceeded by that of the *Kearsarge*.

THE GUNBOATS.

The first vessels constructed by the Department were 23 screw gunboats of 504 tuns each, with a speed of ten knots and a draught of nine feet. They were intended especially for blockading the mouths of the smaller rivers. The *Iroquois*, *Wyoming*, and *Mohican*, were next duplicated, the former twice, in the *Oneida*, *Kearsarge*, *Wachusett*, and *Tuscarora*. The reason for exactly duplicating them was the fact that as the drawings and patterns were still in the hands of their original builders, the machinery could be obtained much quicker, and time was the element of most importance.

These vessels were followed by the paddle-wheel gunboats, twelve in number, of about 850 tuns each, and having a maximum speed of eleven knots per hour. To these succeeded twenty-seven others of the same type, but larger and faster, being of 974 tuns burthen, and having a maximum speed of 14½ knots per hour. Another seven of this class, but still larger, faster, and of iron, have been lately added, all of 1,030 tuns each. These paddle-wheel gunboats have the light draught of 8 feet, and carry enormous batteries. They were built for special service in the narrow and tortuous channels of the shallow sounds and river embouchures of the southern coasts. For these localities, where turning was impossible, it was necessary they should be double-bowed, or constructed with both ends alike, and that their machinery should be equally well adapted for going forward or back. In the autumn of 1861 the Department commenced the construction of ten second-class screw sloops-of-war, of about 1,350 tuns. They have a maximum speed of 12¼ knots, carry a large armament, and are efficient ocean cruisers.

NAVAL STEAMERS BUILDING.

There is now in progress of construction the *Chattanooga*, of 3,000 tuns, building for the Department by outside parties; also the *Idaho*, of similar tunnage, and by other outside parties; while the Department is itself constructing the *Madawaska*, *Wampanoag*, *Neshaminy*, *Ammonoosuc*, and *Pompanoosuc*. These vessels are of wood, about 3,200 tuns, and intended to have a speed of 16 knots per hour. They will carry immense batteries, be full rigged, and will doubtless prove the fastest and most formidable ocean cruisers ever built by any power. There are also in progress of building by the Department twenty first-class wooden screw steamers of 3,200 tuns each, to have a speed of 13 knots, carry enormous batteries, and be full rigged for ocean cruisers. They will soon be completed. While these vessels are building there have been completed the *Nipsic*, *Shawmut*, *Nyack*, *Pequot*, *Maumee*, *Kansas*, *Yantic*, and *Saco*, all screw vessels of 593 tuns each. The machinery is from the designs of various parties building to compete with the Department. The first three, having the Department's machinery, have been thoroughly tried, and can maintain a speed of 11½ knots. There are now nearly completed the wooden iron-clad coast steamers *Tonawanda*, *Miantonomoh*, *Agamenticus*, and *Monadnock*, of 1,564 tuns, drawing 12 feet of water, and having two turrets each, carrying two 15-inch guns. The *Monadnock* has been tried, and is found capable of achieving a maximum speed of 11 knots. There are also in process of construction four other iron-clads of the same type, but larger and to be faster. They are *Kalamazoo*, *Passaconaway*, *Quinsigamond*, and *Shackamaxon*, each of 3,200 tuns. The Department has also constructed 74 wooden and iron-clad vessels of the Monitor type, with an aggregate tunnage of 78,100 tuns. There are now in the navy in active service 558 steamers, with an aggregate tunnage of 408,000 tuns, against the original 26 steamers and 49,500 tuns with which the war commenced. Of this number 200 steamers with an aggregate of 241,000 tuns have been built by the Department.

In no country, and with such limited means, and under such difficult circumstances, has there ever been put afloat in the same time, such immense naval armaments. In no place has there been any failure, but whenever the naval forces moved victory followed. The rebel coast has been held with a grasp of iron and nearly hermetically sealed. The pirates of the enemy have been followed around the world, and captured wherever they could be found, and the internal navigation and command of this vast country has been kept open and in the hands of the Government. The naval administration has done all which any naval administration could do in such a war, and it will still have to be relied on for maintaining a large portion of what has been conquered. Let any one ask himself the question how the contest would stand with the navy withdrawn, if he would understand its necessity and the value of the service it has rendered.

In the foregoing communication I have stated nothing but facts, facts which can easily be verified by reference to official documents, and which I deem justly due to our present Navy Department, in view of the erroneous statements put forth by some writers who evidently know but little whereof they affirm, or intend to mislead public opinion. I hold that in a time like the present, we should all unite to strengthen rather than to weaken the arms of Government.

DONALD MCKAY.

East Boston, Oct. 28th, 1864.

SODA IN COAL GAS.—On examining the flame of the gas supplied in Munich, Professor Vogel remarked a pale soda line which was not observed when the gas was passed through sulphuric acid. On analyzing afterwards the deposit on the surface of a copper burner which had been in use a year, the Professor found a considerable proportion of sulphate of soda.

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Diamond Cameo Photographs.

We have another novelty to bring under the attention of our readers, which will at once arrest the attention of portraitists. We have frequently heard the opinion expressed of late, that the "carteomania" was on the wane, that everybody had obtained his card picture, that the albums were full, and the public beginning to be sated. No doubt this is, in some quarters, to some extent true. The question has been asked, "What will be the next fashion?" In answer to this question, solar camera pictures, or other enlargements, have been doubtfully mentioned. These, it is very probable, will come into increased demand: but the demand can never become a rage at all similar to that which has existed during the last few years for card pictures. The price and size at once preclude the possibility. To take the place of cards, for which the demand begins to flag, the picture must be as cheap, as easily exchanged and preserved, and at least as pretty. The novelty we have to announce more than fulfils these conditions.

The "Diamond Cameo Portrait," introduced by Mr. F. R. Window—whose interesting communications to these pages are familiar to our readers—or more properly by the firm of Window & Bridge, will, we think, give a new impetus to photographic portraiture. The size is the same as that of the card picture, the cost of production is no greater, whilst in beauty, likeness, variety of interest, and force of effect, it is superior to most phrases of portraiture. The picture, as issued by Messrs. Window & Bridge, is of the size of an ordinary card, and contains four portraits, each giving a different view of the face. Each portrait consists of a bust about an inch long, and three-quarters of an inch wide: two are side by side in the middle of the card, and two at the top

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and bottom, arranged in this order 0 0. The top

and bottom generally consist of a front face view and a three-quarter face view; whilst the others consist either of two entire profiles, one of the left and one of the right side of the face, or of a profile of one side, and a five-eighths view of the other; but, of course, much variety in this respect is possible. But the especial peculiarity, and that which gives the cameo effect of the picture, is yet to be described: the oval containing each bust is punched into relief, so as to have a convex surface. The effect of this in giving the illusion of roundness and relief to the whole image, cannot be readily imagined by a person who has not seen it. It is difficult at first glance to believe that the features have not a special relief of their own, and the cameo effect is perfect.

Such a style of portraiture has many real charms and points of interest, besides that of novelty. Almost all the artistic difficulties which beset the photographer are got rid of. The graceful arrangement of hands and legs, and their delineation in anything like true proportion and in good definition, cease to distract the mind. Each small head is taken with the center of the lens, and is unexceptionable in definition; and as the full aperture of the lens may be used without hesitation, the exposure is so rapid that there is no difficulty in obtaining good expressions, an end which is further aided by the entire absence of all torture in the way of arranging awkward limbs, a process so frequently fatal to a pleasant or natural expression in the face. As to the question of likeness and versimilitude, the interest of this style of picture must at once commend itself to every one. There are few people who have not two or more aspects of the face with greater or less degree of dissimilarity, and it not unfrequently happens that the view which is most pleasing as a picture, is least striking as a likeness. The photographer in producing the picture, is thus placed between the horns of a dilemma; if he produce the pleasing picture, candid critics remark, "Very pretty, but certainly not trikingly like;" or, if he secure the striking portrait, the equally candid opinion is, "Very like, but certainly not flattering." In this phase of portraiture, there are four aspects, all under the eye at once. The mind rapidly and unconsciously combines these, and perceives the complete embodiment of the original in its natural aspect; a general rather than a specific likeness, a complete rather than a partial portrait. There is, moreover, in such pictures an entire absence of all vulgarity, the effect being quiet, classical, and artistic.

We have not space now to enter into a detailed description of the mechanical arrangement employed in getting the best result with the least trouble. A very ingeniously-contrived dark slide has very simple movements for obtaining the four portraits in their due positions, and of the right size on the plate. When printed and mounted, the convexity of each disk is produced by means of a steel punch and an arming press, which is worked very quickly. The exquisite surface given by the face of the die to the picture, far exceeds that produced by rolling.

The general effect is that of four cameos or enamels dropped on the card. We understand that the demand for them since their introduction has been very rapid, and they have elicited high encomiums from the highest personage in the realm.—*London Photographic News.*

Improvements in Traction Engines.

The desirability of providing a more economic system of propulsion on common roads than that supplied by horse-power has led to much attention being given from time to time to the perfecting of the traction engine, which, as a compact substitute for enormous teams of horses, is one of the most useful contrivances that could be desired. The small amount of space occupied by a traction engine as compared with cattle cannot fail to give it an advantage, in many instances, which can scarcely be estimated; such, for example, as the moving of a great weight round a sharp curve, where, no matter what the power of a team, it would be comparatively useless, owing to the almost impossibility of applying the whole of the power at once. With the traction engine, on the contrary, the whole of the power being contained within the space of a few feet is always available in the most advantageous form; and hence it is that with the traction engine such stupendous work has been performed.

Although the number of inventions patented for various forms of traction engines is very large, they are all based upon the same principle—that of providing the largest possible surface for applying the tractive power upon. The object in view has been sought to be achieved in about four distinct ways, each of which has some peculiar advantage. In Boydell's, one of the first traction engines introduced, the snow-shoe of Canada and other northern countries was taken as the model upon which to form the endless railway, the continuity of the shoes being ensured by providing a series of them around the periphery of the wheel. Of the efficiency of this arrangement there can be no doubt, but the objection is that the shoes are extremely clumsy in appearance, and much in the way. The system of having wheels with broad tires, acting directly on the ground, is, without doubt, the neatest system; but, owing to the facility with which such wheels sink in the ground, the system has not proved successful. The modification of this, and perhaps the best arrangement of which the traction engine is capable, is the use of drums, within which the driving wheels work, the drums being kept in position by the use of guides affixed to the sides of the engine. The fourth system is that of affixing the rails to boards, which are hinged together and guided by running over polygonal wheels or their equivalents. The system, although it has some objections, is, no doubt, capable of such improvement as shall render it of practical utility. It is upon this system that the invention of Mr. W. Chapman, of Clonmel, is based. The invention, he observes, relates to vehicles for common roads, whether propelled by steam, such as traction engines, or drawn by animal or other power, and is intended to facilitate the draught of such vehicles. The improvements consist in the employment of an endless suspension railway, composed of an endless series of rails, hinged or jointed together, carried by a pair of circular or polygonal-shaped carrying wheels, revolving clear of, or out of contact with, the ground, upon independent axles of their own, carried by the framing of the vehicle. The driving or supporting wheels of the vehicle are situate between, and in a line with, the wheels that carry the endless railway, so that they can run upon the rails laid down for them by the carrier wheels. The wheels, which are of steel or wrought iron, the inventor prefers to make of a bridge section, the broad flanges resting upon the ground, while the supporting or driving wheels of the vehicle bear upon the raised portions of the rails; they are jointed together, end to end, so as to form a continuous series, and may have filling pieces of wood fitted on to them to prevent noise, and cause them to fit accurately on to the circumference of the carrier wheels, whether such wheels be circular or polygonal. It is to be hoped that ere long the success which Mr. Chapman has met with will be announced.—*London Mining Journal.*

A Remarkable Steam Boiler.

Yesterday the boilers of the U. S. "double-ender," *Algonquin*, building by the Providence Steam Engine Company, were tested, and exhibited such results as to astonish the practical men who witnessed the trial. The boilers stand on the dock without any chimney whatever, so that the only draft was that which was produced inside of the boilers themselves, which usually would not serve to make steam in less than two or three hours of firing. In these boilers, however, steam was produced in seventeen minutes from the time the fire was lighted; and in half an hour the pressure was about seventy pounds to the inch. The safety-valve was then opened and the steam blown off at a pressure varying from seventy to thirty pounds to the inch. At the pressure of thirty pounds the safety-valve was blocked open, but the steam could not be blown down below that point, although the safety-valve is about twice as large in proportion to the grate surface as is usual, and the fire was made of ordinary cord-wood burning without any chimney. Instead of blowing off water from the open valve, as boilers usually do, nothing but pure steam could be seen, thus showing that no heat is lost by working water; and the products of cumbustion as they pass from the boiler tubes are so cooled that persons were walking on the perforated plate through which the hot gases were escaping, without burning shoes or clothing, and the hand could be held at the aperture of the tube without any inconvenience whatever. Before the boilers were fired up they were subjected to a cold water pressure of more than a hundred pounds to the inch, which they endured without complaining.

The boilers are less than half the usual size, and yet they make pure steam without any "steam chimney," in less than a quarter of the time usually required, and in far greater quantities, from the same weight of fuel, than any other boiler ever constructed can do.

Persons interested ought to inspect these boilers before they are placed in the ship. They are the invention of Mr. Edward N. Dickerson, of New York, who has patented them here and abroad. The entire machinery of the *Algonquin* is building upon his plan, and the boilers are the first part tested.—*Providence Journal.*

A New Treatise on Ordnance and Armor.—Upon another page our readers will find an advertisement of a new book on these subjects, which embraces examples of modern guns and iron-clad ships up to the very latest period, including descriptions of the Ericsson and Ames' guns, as also 432 illustrations executed in fine style of English and foreign guns, and armor generally. This book will soon be published, is ready to issue now, and is invaluable as a work of reference.

The Engine in Lieutenant Cushing's Launch.—The engine which propelled Lieutenant Cushing's torpedo boat, was one of Root's patent, and was illustrated on page 193, Vol. X, of the Scientific American. This efficient machine is now in all the picket boats in the service; its extreme compactness, in proportion to its power, especially fitting it for such work. A five horse engine stands in a space of 18 by 20 inches. Over 200 of them have been made since they were patented.

To Prepare Iodide of Cadmium.—Dr. Vogel says:—"Dissolve twenty-six parts of iodide of potassium and fifteen parts sulphate of cadmium in water, and condense. Heat the residue with absolute alcohol, whereby iodide of cadmium, which is easily soluble in alcohol, is separated from the sulphate of potash."—*Photographische Mittheilungen.*

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THE GEOLOGY OF PETROLEUM.

We publish in this number an article by that practicle geologist, Dr. Stevens, giving a detailed statement of the geographical localities and the geological formations in which petroleum is found on this continent. To bring the positions of the rocks mentioned directly under the eyes of our readers, we insert below the table of geological formations prepared by the professor of geology in Union College, Schentady, for the use of the classes of 1864 and 1865.

It will be understood that the rocks in the earth's crust occupy the same relative positions as their several names in the table, the rocks formed in the azoic epoch being lowest in the series, and those of the historical epoch the highest.

SUBDIVISIONS OF GEOLOGICAL HISTORY.

ERAS.	AGES. BOTANICAL.	AGES. ZOOLOGICAL.	PERIODS.	EPOCHS.
Era of Mind.	Age of Palms, and	Age of Man.	Human.	Historical.
				Terrace.
Cenozoic Era.	Dicotyledons	Age of Mammals.	Post Tertiary.	Pleistocene.
			Tertiary.	Pliocene.
				Miocene.
				Eocene.
			Cretaceous.	Upper Cretaceous.
				Lower Cretaceous.
				Wealden.
Mesozoic Era.	Age of Cycads.	Age of Reptiles.	Jurassic.	Oolitic.
				Liassic.
				Keuper.
			Triassic.	Muschelkalk.
				Buntersandstein.
			Permian	Permian.
			Carboniferous.	Upper Coal Measures.
				Lower Coal Measures.
	Carboniferous Age, Age of Acrogens or Coal Plants.	Age of Amphibians.		Millstone Grit.
			Sub-Carboniferous.	Up. Sub-Carboniferous.
				Lo. Sub-Carboniferous.
			Catskill	Catskill.
			Chemung.	Chemung.
				Portage.
				Genesee.
Palaeozoic Era..		Devonian Age, or Age of Fishes.	Hamilton.	Hamilton.
				Marcellus.
			Upper Helderberg or Corniferous.	Upper Helderberg.
				Schoharie.
	Age of Sea Weeds.			Canda Galli.
			Oriskany.	Oriskany.
			Upper Silurian. Lower Helderberg.	Lower Helderberg.
		Silurian Age. or Age of Molluscs.	Salina.	Saliferous.
				Leclaire.
			Niagara.	Niagara.
				Clinton.
				Medina.
				Oneida.
			Lower Silurian. Hudson.	Hudson.
				Utica.
			Trenton.	Trenton.
				Chazy.
			Potsdam or Primordial.	Calciferous.
				Potsdam.
Azoic Era.	Azoic Age.		Azoic.	Azoic.

Oil.

A great geological formation is now being deposited at the bottom of the sea between Newfoundland and Ireland. In the same way most of the rocks of the earth have been formed. As they have been deposited at the bottom of the ocean over a limited portion only of the earth's surface, they have not entirely covered the rocks that were formed before them, but as the newer rocks lap over the earlier, it is easy to see from the inclination of the strata at the surface which run under others, and which are therefore the lower and older formations.

It is now fully settled that the word azoic (without life) as applied to these geological formations is a misnomer; they all being filled with organic remains. Doubtless in the next chart prepared by Union College a more appropriate name will be employed. Indeed the whole nomenclature in those two columns called in this table "periods" and "epochs," is a conglomerate mass of confusion which will unquestionably soon give place to a more rational classification. The "ages" are divided strictly according to the positions of the rocks and the fossils which they contain, and there is now no good reason why the subdivisions should not be made on the same basis. But glancing at the "periods" we find the latest rocks at the head of the column get their name from zoology, the next two from the obsolete geology of the last generation, the cretacious comes from mineralogy, the next three each from one of the geographical localities where the rocks are found, the carboniferous are so named from their chemical constitution, then downward they are geographical till we come to the azoic, which has, as we have said, no foundation whatever.

Comparing the table with Dr. Stevens's statements it will be seen that the oldest rock containing petroleum in any considerable quantity on this continent is that ancient coral reef extending from eastern New York westward across the Mississippi, which was built up in the shallow waters then forming the southern boundary of the continent, in those remote ages when there were neither land plants nor animals, but seaweeds and fishes were the highest orders of organized beings inhabiting our globe. Advancing upward in the series, and downward in the slow march of time, petroleum continued to be distilled into the cavities of those rocks which were being deposited till after the creation of amphibious animals, and the appearance of those low orders of land plants which grow in the vast marshes that have since been converted into the coal beds of Pennsylvania and the West.

In these cavities this singular fluid has remained during those immeasurable ages that witnessed the creation of the first species of reptiles, the slow developement and slow decay of these species, to be followed by others in long succession, till the earliest appearance of pure land animals, then through the like slow progress by successive species of the mammalian races, till finally the secret hoard has been discovered for the use of this present generation of men.

RAILWAYS IN INDIA.—There are at present ten railways in India either opened for a portion of their whole distance or in process of construction, and some of these have branch lines. Two lines, the Scinde (114 miles) and the Eastern Bengal (115 miles), are finished their whole length. The total length of line now opened for traffic is 2,687¾ miles, and 2,100 miles yet remain to be constructed before the system, as far as sanctioned, will be completed.

IMPROVEMENT IN PHOTOGRAPHY.

Jacob Wothly, a German photographer, has made an improvement in photographic printing which promises to be of much importance. Instead of preparing the paper, upon which the print is to be made, with albumen, he employs collodion; and, instead of the nitrate of silver as a sensitizer he uses one of the double salts of uranium. This salt is mixed with the collodion, and the only operation required is to pour the collodion upon the sheet of paper and hang it up to dry.

The first notice of the foregoing improvement we find in the *British Journal of Photography* of Sept. 30th. The editor having witnessed the new process of preparing the paper by Col. Stuart Wortley, described it as follows.—

"First of all he took a sheet of plain paper (plain in the sense of its being neither salted nor albumenized); this he attached to a small piece of flat board, about its own size, by means of a couple of pins. He now coated it with a peculiar kind of collodion, no light being admitted into the room except that which entered through the large yellow window of the well-appointed laboratory. The paper was then removed and suspended in a dark closet for a short time, until it became dry. In this state the paper is sensitive, and this treatment is all that is required to make it ready for exposure in the printing frame. But not only so; the paper will keep, ready for exposure, for a considerable time. When we entered the laboratory, a picture was being washed which had just been printed on a sheet of paper sensitized in Germany, nearly a fortnight previously. When the collodion had become dry, the paper was placed under a negative in a printing frame and exposed to light. So far as we could judge it received an exposure of from ten to fifteen minutes, or about the same time as would have been given to a silver print under similar conditions of light. Unlike a silver proof, this received no over-printing, there being no lowering of the tone by the subsequent operations. When removed from the printing frame and examined it showed a well-defined and tolerably strongly-marked image of a bister tint. It was then fixed by being, for two or three minutes, immersed in a large dish full of liquid; and, after being removed and rinsed with water under the tap, it was then transferred to a second dish, in which it rapidly acquired a rich deep purple tone. After another rinsing under the tap for a few minutes, the picture was finished.

"The simplicity of the whole operation struck us as being wonderful.

"Let us now glance briefly at some obvious advantages possessed by this new printing process. The property which it possesses of allowing a stock of sensitive paper to be kept ready for use when convenient, will approve itself to many as being one of no small value; and, were this the only advantage possessed by it, it would of itself be sufficient to entitle it to the consideration of all photographers. But its claims are of a higher nature. No over-printing is necessary. When the eye is satisfied with the amount of detail visible, all the conditions of exposure are satisfied. There is no tax on one's judgment as to the amount of surplus printing requisite to compensate for the subsequent lowering of tone in the fixing; and in this the new process contrasts most favorably with silver printing. Uniformity of result as regards tone is another advantage claimed for this process. Variety of tone may, indeed, be obtained; but only, we understand, by varying the proportions of the chemicals employed. It is also stated to be very much cheaper than silver printing, which—there being no silver bath employed at all—we can readily enough believe. But its crowning advantage seems to consist in its discarding the aid of hyposulphite of soda. This useful and hitherto indispensable servant has been the subject of much invective, and doubtless deservedly so. But in the case before us its services are dispensed with, and all the train of evils attendant upon its employment are happily evaded and, in connection with this, the lengthened washing which was entailed upon prints will not now be requisite.

"But before deciding on the exact value of these advantages, which it will be readily conceded by all are real and important, it may be most pertinently asked, Of what quality are the prints?'—a question

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the answer to which decides the value of any printing process, no matter how simple and otherwise advantageous it may be. Our answer is brief. In all or any of the good qualities of a print—in tone, vigor and gradation—the prints which we saw produced by this process were not inferior to the finest quality of silver prints we have yet seen. Some of the specimens which we examined were totally devoid of any approximation towards the glaze which characterizes prints on albumenized paper, and these were perhaps the richest-looking photographs which have yet come under our notice; while others possessed the characteristic glaze alluded to in greater or less degree. This would seem to indicate the power of modifying the process to a considerable extent.

"With respect to the peculiar chemical agents employed, beyond the fact that some preparation of uranium constitutes an important ingredient in the collodion, we are not aware of what it consists. In the course of a few months, however, complete details will be given to the public. The toning bath contains some salt of gold; and, we believe, retains its toning powers up to the last atom of gold present in it."

On this discovery the London *Times* remarks:—

"The new process which has been discovered in Germany by Herr Wothly, and from him has been named 'Wothlytype,' discards nitrate of silver, and discards albumen. For the former it uses a double salt of uranium, the name of which is at present kept secret; for the latter it uses collodion. We have explained that by the ordinary method, the paper to be printed is sized with albumen, and the surface of the albumen receives the silver preparation, which is sensitive to the light, and shows the printed image. The paper thus does not receive the image, but is, as it were, a mere bed on which lies the material that does receive it. By the substitution of collodion for albumen, a different result is reached. In the first place, the film of collodion on the paper yields a beautiful smooth surface on which to receive the image, and the result is, that pictures are printed upon it with wonderful delicacy. In the second place, the collodion, before it is washed upon the paper, is rendered sensitive by being combined with the salt of uranium. The sensitiveness, therefore, is not on the surface alone of the collodion film, it is in the film itself, and so completely passes through it, that even if it be peeled away from the paper, the image which it received will be found on the paper beneath. The vehicle thus employed is not less superior to all others yet known for receiving the negative image on paper, than it is to all others yet known for receiving the negative image on glass. The metallic salt which combines with it has also rare merits.

"In the first place, the manipulations are very simple and easy—far more so than in the silver printing process—and thus the labor saved is considerable. Next, the paper, when rendered sensitive for printing, or 'sensitized,' as the photographers say, keeps perfectly for two or even three weeks—an immense boon to amateurs, who can thus have their stock of printing paper 'sensitized' for them; whereas, at present, when the paper receives the sensitive preparation, it has to be used almost immediately, and will not keep more than a day or two. Thirdly, the color and tone obtained are very various, including every shade that can be got by the ordinary silver plan; but, in addition, it has the advantage of being able to print any number of impressions of exactly the same color, and of doing away with all such difficulties as show themselves in mealiness and irregular toning. The precision of result is a great point. By the silver process, the results are never certain, and even when the print comes out perfect from the frame, the subsequent process of washing and fixing go seriously to alter it. Lastly, the permanent character of the new method is very remarkable. Nobody seems to know exactly why the old silver process gives way—whether it be on account of the albumen, or the nitrate of silver, or the hyposulphite of soda. We only know, that so many of the prints prepared by the old method fall away, that no reliance can be placed in those which seem to stand firm."

CORNISH PUMPING ENGINES.—The number of pumping engines reported in England for August is thirty-five. They have consumed 1, 719 tuns of coal, and the average duty of the whole is 51,000,000 lbs., lifted one foot high by the consumption of 112 lbs. of coal.

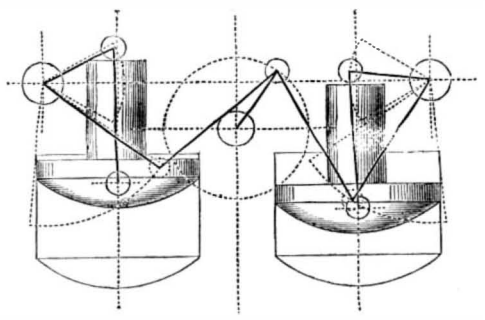
THE ENGINES OF THE "DICTATOR."

To the professional observer the engines in the ocean iron-clad ship *Dictator* are not less remarkable, or interesting, than the vessel itself. As an example of what modern screw engines should be, they are worthy of examination. The simplicity of the design, the directness of the action, the entire absence of superfluous ornament and weight of metal, as well as the harmony in the vast proportions of the machines, strike the engineer at once. The cost of construction, which is usually very great in large engines, must have been much reduced in these, for there are no intricate castings, no joints, levers, or other parts which are not readily made in any ordinary machine shop.

It is a great advantage in these engines that they can be repaired in ports where there are only the ordinary facilities. No costly and ponderous crank shafts are to be seen, but the rod of each engine connects directly to a driving wheel on a straight shaft.

Neither are there any massive links for engineers to sweat and tug at in order to reverse the engines. A simple movement of the hand controls both of them with facility, and a boy ten years old could work them. They have been reversed from full ahead to full back in 20 seconds. Hydrostatic pressure moves the reverse gear as well as the cut-off valves, and the system is free from the objections which have hitherto attended this method of working reverse gear. Means are provided for working the engines by hand if necessary. The engines sit athwart ships, and the valve-gearing is in the center. Everything is in plain sight, and from his post the engineer can see every pin and principal part at a glance.

We take pleasure in being able to present a diagram of the movement, which is here appended.



THE MOVEMENT.

The diagram represents the engine as viewed from the stern of the ship; the cylinders, pistons and trunks being seen beyond the cranks and levers. It also shows the relative positions of the various parts, just as the port engine has commenced its descent, the starboard piston being somewhat above half up-stroke, with the connecting rod acting on the driving crank of the propeller shaft, nearly at right angles. Letters of reference are unnecessary, the movement being self-evident on inspection. The extreme movements, and the arcs described by the vibrating levers, are indicated by dotted lines; also the circle through which the crank-pin sweeps. The movement and general arrangement are identical with those on the U.S. steamship *Princeton*, constructed by Ericcson in 1842. If we substitute vibrating pistons, moving in semi-cylinders, for the two horizontal rock-shaft levers, we have the *Princeton's* engine. The arrangement is appropriately termed the "Princeton movement." All the vessels of the *Passaic* and *Tecumseh* class of monitors have engines built on this plan, with the difference only that the cylinders are placed horizontally, back to back; forming, in fact, one cylinder, with two pistons, which actuate the short rock-shaft levers. The *Monadnock*, the daily press tells us, has engines of Mr. Isherwood's construction. This is an error. Her engines are of the same kind, and built under Ericsson's patent.

ADVANTAGES OF THE SYSTEM.

The intelligent engineer will at once notice that the driving crank of the propeller shaft has a much greater throw than that due to the stroke of the pistons. This is the distinguishing feature of the vibrating lever engines; the great advantage resulting from it being a reduction of the strain on the main crank pin and journal, about one-half that of ordinary engines of equal power. It will be seen also that the slides of ordinary steam engines, which are exposed to such heavy angular thrust from a short connecting rod, have been done away with, and, above all, that the right-angled cranks of the common screw engine have been superseded by this arrangement. The serious difficulty of keeping several crank-shaft journals and crank pins always in line is thus obviated, as also an immense saving in the cost of construction.

DIMENSIONS.

Diameter of cylinders, 100 inches; stroke of piston, 4 feet; throw of main crank, 3 feet 8 inches; long rock-shaft lever, 7 feet 4 inches; short ditto, 4 feet; diameter of crank-shaft journal and propeller shaft, 21 inches; rock shafts, 23 inches diameter, with 14 inches journals at the ends. Main piston links, 7 feet from center to center; main crank pin, 14 inches diameter and 20 inches long. The cylinders have two steam ports, 24 by 9 inches at each end; cut-off steam ports, 3 by 24 inches, 8 in number, opening and closing simultaneously; air pumps, 50 inches diameter, 2 feet stroke; propeller, 21 feet 6 inches diameter, 34 feet pitch; weight, 39,082 pounds. The entire frame work and pillow blocks of the engines are composed of polished wrought iron. The main crank is inserted in a polished cast-iron balance wheel, 12 feet diameter, the balance weight being arranged in a peculiarly tasteful and symmetrical manner. Viewed in connection with the massive character of the working parts—also all composed of polished wrought iron—the *Dictator* engines may be considered the finest specimen of marine engineering afloat. The engine room is 32 feet wide, 33 feet long, 12 feet high, and well lighted.

VENTILATION OF THE ENGINE ROOM.

A remarkable feature of this engine room is a fan wheel, eight feet diameter, composed of polished copper, suspended horizontally under the upper deck, and worked by a direct-acting horizontal engine, also bolted to the deck beams. A cylindrical trunk, 4 feet diameter, 3 inches thick, made of plate iron, is secured to the deck above the center of the fan wheel, a hole being cut in the deck for admitting the air from without to the fan, which is not inclosed in a box as usual. The fresh air drawn in is therefore distributed all over the engine room by the rotation of the wheel; complete ventilation being the result of this peculiar arrangement. The air thus drawn in and distributed passes off through two hatches in the engine-room floor—which is ten feet above the ship's bottom—into the boiler room.

THE BOILERS.

The *Dictator* has only six boilers, but they are unusually high, and are constructed with two tiers of furnaces. The total amount of heating surface is 3,400 square feet; total grate surface in 56 furnaces, 1,120 square feet. The boilers are of the Martin pattern, somewhat modified, and contain 10,640 tubes, the united length of which is 7⅓ miles; nearly two miles more than in the *Warrior* and *Black Prince*, English ironclads. In addition to the circulating fan in the engine room, already described, the combustion in the boilers is aided by two Dimpfel blowers, 78 inches diameter each, applied under the turret, through the top of which the air is drawn in. The smoke pipe is 10 feet diameter, 8 inches thick at the base, and is provided with a shell-proof grating placed about 6 feet above deck. The ash trunk through which the ashes are hoisted up at sea, is within the smoke pipe, there being a door on the side through which the ash bucket is taken out from the top of the hurricane deck, sufficiently high to be out of reach of the waves at sea.

LARGE COPPER CASTING.—Mr. Thornton, of the Elms, has in his possession the largest copper idol ever brought to this country, and one of the modern wonders of the world. Under a shed in his coach-yard is no less a personage than the god Buddha, measuring over seven feet in length, and one of the most marvellous pieces of copper casting ever found. Direct from one of the lower rooms of his temple, where he had been hidden away some 2,000 years ago, his godship has been brought to the New World capital of copper and bronze castings. It will probably be deposited in the Midland Institute. Thus, after a lapse of 2,500 years, Buddha will be enthroned again in a temple better worthy of him, because devoted to higher and more ennobling pursuits than the one in which he found his first resting place in the temple of Scottangunge.—*Birmingham Post.*

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Correspondence

Gilding on Glass and China and Enameling.

MESSRS. EDITORS:—The tools required for this business are as follows:—Gilder's cushon, gilding knife, camel hair g'lder's tip—cotton wool is best—camel hair pencils; also, a tin dipper, containing, water two parts, new rum one part, and two grains of isinglass dissolved by heat in the liquid. Use this solution cold.

Clean the glass both sides, make a design on the glass with soap sharpened to a point, place the design face downward, on clean paper, having cut the gold leaf to the design roughly and wet the glass over the design with camel hair pencil; lift the gold with the lip brush, and place it on the wetted gloss; over the design continue the process till the design is covered. Then place the glass aside to dry; in about two hours afterward, with the camel hair pencil, coat the gilding once over with the same liquid, and again dry it. When dry smooth the gilding gently with fine cotton wool, free from rough particles. Then regild as before, and finish in like manner. Transfer the design on the gold side by any mode that will be free from grease. Then remove the superfluous gold; with a boxwood point make the edges perfect, and keep the point sharp and clean. Take white paint in oil, or weak gilder's whiting, as described on page 230, present volume, and coat the design all over, one coating after another, until the surface is rendered opaque. Each coat should be dry before the other is applied. The reverse side will appear, by reason of the transparency of the glass, to have a high polish. If gilder's size or whiting is used it should be weak, as that will increase its whiteness; by using oil paint the work done will be water-proof.

Gilding on china is done as above (no paint or soap used) and is rendered water-proof by coating the surface with white shellac varnish. Two coats may be applied, but while it is moist the work must be subjected to about 90° of heat or the varnish will become milky, and the design obscure. This is pleasant work for ladies. THOMAS TAYLOR.

Washington, D. C., Oct. 29, 1864.

Osage Orange Hedges and Mulching Potatoes with Straw.

MESSRS. EDITORS:—Mr. Robinson's statement "that the Osage orange cannot stand 20 or 30 degrees of cold," reported in the proceedings of "The Farmer's Club," in your issue of Oct. 22, is not sustained by the facts in this portion of Illinois. Osage orange hedges, old enough to bear fruit, are all very full this year; the fruit being well grown, many of them being three inches in diameter; although the severe cold of last winter killed thousands of peach trees, and cut off the fruit from peaches, apples, pears, plums, and grapes, showing conclusively that the Osage orange is much hardier than our fruit trees. There are hundreds of miles of Osage orange hedge in the State of Illinois; and in ten years there will be thousands of miles of it. All the fruit made this year is being bought up for the purpose of starting-plants for next spring's sales. One individual engaged in this business thinks he will realize in this way $10,000 out of the seed he has secured up to this time. Since the war commenced it has been ascertained that the home-raised seed turns out to be a really better article than that brought from Texas; it not having gone through a scalding operation, and not being two years old before it gets to market. Our native seed will grow three feet the first season. Millions of pounds can be sold next season; our farmers showing decidedly that on the "Western prairies" they have no fear of extreme cold, and will exert themselves to plant miles of "Osage orange hedging."

South of this latitude, owing to dry summers, the potatoe is one of our most uncertain crops, almost as uncertain as the grape, which mildews everywhere in prairie soil. To meet the difficulty the use of straw mulching is coming generally into use; the potatoe raised in this way being uniform and of a large size, very clean and palatable. The most popular methods of mulching are to cover in the rows, as stated by Mr. Tucker, with straw only; to cover with straw from six to twelve inches, and cover straw with soil; to plant shallow and cover with straw; and to cover all the ground with straw, the deeper the better.

The "potatoe bug," a species of cantharides, but exciting so much irritation when used medicinally, as to be dangerous, is the great enemy of the potatoe in Southern Illinois. If he gets into your patch your potatoes are trimmed of their leaves, leaving a naked stalk above and below ground for you to exercise your philosophy on; he cares very little about applications of lime, snuff, grease, or turpentine, on the upper side of the leaf, he getting on the inside and eating nearly through. Turkeys, chickens, geese, birds, and pigs, avoid him as they would red hot nails. He marches victorious through your potatoe field, and makes you resolve "that you will never plant another potatoe." This year another species of potatoe fly has been ravaging the crop along the banks of the Mississippi, below St. Louis; but I am not familiar with it. The potatoe raised in Southern Illinois is entirely free from rot, yet I have seen cases of it; but the seed had been imported from Wisconsin or Northern Illinois. To my mind the potatoe rot is a disease produced by excessive moisture, like rust or smut in wheat. If this is the case, seed from Southern Illinois, properly selected and carefully packed, would be worth experimenting on in Great Britain. J. T. D.

Springfield, Ill., Oct. 23, 1864.

The Atwater System of Rifling.

MESSRS. EDITORS:—Will you allow me the use of your columns for the purpose of correcting so far as lies in my power, an error which I have been the means to some extent of propagating. In my "Hints to Riflemen," published last spring by Messrs. Appleton & Co., I gave an account (pp. 82-89) of the Atwater system of rifling and the wonderful increase of penetration attained by it. Most of the details there given were from the statements of others, and I expressly stated that I had only once had an opportunity of witnessing the shooting of a gun rifled on that principle, in which case the results seemed to confirm the statements I had received. On that occasion I saved some half dozen or more of the bullets which I cut from the target, and put them away properly labelled.

Since the publication of my book I have received a great number of inquiries, verbal and written, in regard to the Atwater rifle, but have never been able to learn anything except in general terms that the experiments with the large piece of ordnance at Washington were entirely satisfactory. I am not prepared to deny that such may be the case, and I have some testimony from other quarters which tends to confirm the theory on which the whole system is based, but my present object is to expose a piece of deception which I have just discovered, and of which I was the victim. At the trial which I witnessed and which was conducted at a shooting range on my own premises, I was assured that the bullets were made of "the softest lead that could be procured," and I had such assurance of the character of the parties who had the matter in hand that I took their word for it without question. A few weeks since while conversing with a friend on the subject, I took the bullets from the paper and was instantly struck with their fresh white color, contrasting strongly with the dull leaden hue of others which had been preserved for more or less time, suggesting at once the idea that they must contain an alloy of hard metal. I therefore lost no time in placing them in the hands of our State Assayer, Dr. Charles T. Jackson, for analysis. I have just received his report, and learn by it that the metal contains 51 per cent of tin, which would harden the bullets sufficiently to produce all the effect attributed to the system of rifling.

I regret that I should have been the means however innocently, of deceiving others.

H. W. S. CLEVELAND.

Danvers, Mass., Oct. 29, 1864.

Words Fitly Spoken.

MESSRS. EDITORS:—Your favor of the 25th ult., enclosing official notice to allow "application for a patent for an improvement in sectional boat" was duly received. I have been a careful reader of your valuable paper for thirteen years, and am indebted to its columns for much useful information and very many new ideas. I have no work in my library to which I have more frequent occasion to refer than to the SCIENTIFIC AMERICAN. I shall omit no opportunity to recommend your Agency in connection with your paper as being the most reliable, complete, and effective method of procuring and introducing patents practised in this country. I shall avail myself of your valuable services again before long.

E. HEATH.

Rochester, Oct. 27, 1864.

Remarkable Plumb-line Deflection at Cowhythe, England.

We are enabled to furnish our readers with the following particulars respecting this curious local disturbance of the plumb-line in our neighborhood, which is now the subject of research, with a view to its being traced to its limit, by a party of the Royal Engineers, under Colonel Sir Henry James, R.E., F.R.S., etc., Superintendent of the Ordnance Surveys. Early during the present century the headland eastward of Portsoy on Cowhythe was visited by an officer of the Royal Engineers with the zenith sector, constructed for the Ordnance survey of this country by the celebrated Ramsden, and from the observations made with that instrument to determine the latitude of the trigonometrical station there, it was found that the plumb-line, instead of being vertical, was deflected northward of the zenith and southward of the earth's center fully nine seconds of angular measure. This extraordinary and unexpected result was viewed with great interest by the scientific world, especially by such as were employed by their respective governments in connection with the determination of the figure of the earth; and, by way of verification, a party of the same corps, some sixteen years back, furnished with a new zenith sector, designed by the present Astronomer Royal, and constructed by Troughton and Sims, visited the same spot. More observations, and to a greater number of stars, resulted in confirming the first or earlier determination; and here the matter rested, merely as a subject of occasional wonder to those concerned, till recently the Russian Engineers, in prosecution of their national survey, came upon a similar anomaly in the neighborhood of their ancient capital, Moscow. On tracing it to its limit, which they have done in a public-spirited and most creditable manner, they concluded that there is a vacuum, or a comparative vacuum, of a great many square miles in extent, under the earth's surface in that country. To give some idea of the reasoning which leads to so startling a conclusion, the reader may conceive a wide, deep pit with a plummet suspended from its mouth at the earth's surface. The plumb-line will be vertical only when in the center of the pit (or shaft, it is called in connection with mines), because it will there be equally attracted in every direction. If carried round the side of the pit, the line will be so deflected from the vertical as to cause all the lines, if produced upwards, to meet in a point above the earth's surface: and such are the phenomena discovered by the geodetical engineers of Russia. The pit, it is true, is closed at its mouth, and no plumb-line can be let down into it, but the spirit level, being always at right angles to the plumb-line, discloses the fact as clearly to the mind as the open pit would to the eye. Now, whether the Cowhythe deflection is to be accounted for by a comparative vacuum on the north under the Moray Firth, or by some unknown mass of extraordinary density on the south, or partly by both, is the problem to be solved, and, doubtless, it will ultimately be solved by the thoroughly trained staff of astronomical observers and computers under their talented chief, Sir Henry James. Their present operations with zenith telescopes, transits, chronometers, theodolites, etc., were commenced at Cowhythe in August, and are now extended southward to the Fourman Hill, near Rothiemay and Westerfield (formerly known as the Haggs) near Inverkelthny, all in Banffshire, where our Highland tourists may see the parties regularly encamped with their portable observatories and instruments all in working order. The general result can be but briefly stated to be a diminution of the deflection as the observers proceed southwards, but how far it may extend is of course at present unknown.—*Banffshire Journal.*

[Perhaps there is a great deposite of gold south of

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the Cow hythe headland instead of a cavern at the north. In that case we should have the charlatan's divining rod succeeded by the astronomer's zenith sector in the search for precious metals.—EDS.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week ; the claims may be found in the official list:—

Tobacco Pipe.—This invention consists in a pipe for smoking tobacco cartridges, the novelty being found chiefly in a radiating plate which protects the chamber and tube of the pipe from the destructive effects of the great heat of the burning tobacco, and also prevents them from becoming foul and offensive so soon as in other forms of smoking pipes and tubes. H. J. Hall, of New York city, is the inventor.

Knitting Machine.—This invention consists in the employment in knitting machines of a grooved needle in combination with a sliding eye-closer or casting-off needle, operated by a suitable cam, in such a manner that the first or old loop is allowed to slip back over the point of the casting-off needle unto the shank of the main needle, and when said needle has received the yarn from the guide and is drawn back, the cam holds the casting-off needle forward until its point meets the hook of the main needle and the eye thus formed retains the yarn and permits the old stitch to slip off over the end of the needle forming a new stitch or course; the invention consists, also, in a shoe applied in relation to the needles and needle bed, in such a manner that when the needle bed has become worn and the needles get loose they will be held down to their places and prevented from rising and interfering with the guide or other parts. S. L. Otis, of Manchester, Conn., is the inventor.

Power for Sewing Machines.—The manifold attempts heretofore made to drive sewing machines by spring or weight power have all been failures, principally for the want of a suitable device to regulate the speed of the machine. If a spring or weight is applied powerful enough to overcome the inertia of all the working parts and to start the machine, it, the machine, soon begins to race and to assume a speed quite incompatible with the successful operation of sewing, and if the spring or weight has not sufficient power to start the machine the whole device is useless. These difficulties are overcome by the power which forms the subject matter of this invention. It consists in the application of an adjustable friction device or regulator acting upon the fly-wheel, or any other part of the sewing machine and used in combination with a series of gear wheels to which motion is imparted by a spring or weight, and from which motion is transmitted to the main driving shaft of the sewing machine and through it to all the working parts of the same, in such a manner that the motion or speed of the sewing machine can be regulated independent of the power of the weight or spring, and a weight or spring can be employed of sufficient power to work the machine for a long time without winding up. J. Zuckermann, San Francisco, Cal., is the inventor.

Circular-saw Mill.—This invention relates to a means for driving circular saws and controlling the feed movement of the carriage on which the stuff to be sawed is placed and dogged. The invention consists in the employment of a belt-tightener arranged with two belts, whereby either belt may be rendered operative or inoperative as desired, and the driving belt made, when required, to operate as a brake for the feed mechanism of the carriage. P. D. Shaw, of Carson city, Nevada Ter., is the inventor.

Fruit-preserving Jar.—This invention consists in the employment of a glass stopper of conical form and provided with an annular india-rubber packing and a central opening in which a cork is fitted, all being arranged in such a manner that the fruit, after being placed in the jar and the latter sealed with the large stopper and packing, may be covered and the jar entirely filled with the liquid or sirup as well as the opening within the glass stopper, said opening serving as a reservoir to admit of the jar being supplied with liquid or sirup, as the contents of the jar become cool and contract or decrease in bulk, thereby keeping the fruit covered, which prevents it from molding. G. F. S. Colburn, Newark, N. J., is the nventor.

Burglar-proof Safe Lock.—This invention relates to a new and improved burglar-proof lock of that class in which a key is not employed for operating the bolt and in which circular tumblers are used. The object of the invention is to obtain a lock of the class specified, which will not admit of the tumblers being tampered with so that a knowledge of their position can be attained in order to pick or illegitimately unlock the lock; and also to have a ready and convenient means for effecting the "changes" of the tumblers, so that they may be adjusted to different marks, figures or letters, in order that the lock may be unlocked; and, further, to have the dog and bolt so arranged that the latter may, in connection with a slotted disk, be acted upon by the former in a perfect manner. P. S. Felter, Cincinnatus, N. Y., is the inventor.

INTERESTING ENGLISH PATENTS.

Plans and specifications for the following subjects have recently been published in England. They are interesting, and will repay perusal. Doubtless some of our readers may obtain hints from them. Utilizing the power of sea waves, although not new, can be made to do service in some situations:—

Applying and transmitting Motive Power Obtained from the Sea.—It is, according to this invention, proposed to employ the ascentional power of the wave by transmitting it to the pistons of a pneumatic engine in the following manner:—At any point of a beach, or of any construction built on the sea shore, it is proposed to place an arrangement of two or more pulleys on which will roll a cable having at one end a buoy and at the other a counter weight, which may rise and fall in a well made for such purpose. The pulleys, by the constant come-and-go motion of the wave, which will at one lift and at another lower the buoy, may be guided by connecting rods, which act upon the pistons of air compressing machines, which will store this compressed air in reservoirs provided for this purpose, and placed even several miles inland at the places where the power is required. The distribution of this power will be effected through pipes, by which it will be dispensed to blast furnaces, spinning factories, or other places where it may be required.

Pontoons or Caissons Applicable to building Structures in Water.—In carrying out this invention the patentee proposes to construct the pontoon or caisson of iron of any required dimensions. The proportions which he considers efficient would be about 100 feet long, 50 feet wide, 30 feet deep. The bottom or floor consists of a horizontal division or partition placed about 20 feet from the top of the caisson, so as to divide it into two chambers, the upper chamber being 20 feet deep, and the lower chamber 10 feet deep, without a floor or bottom. A large circular or square hatchway is made in the partition, and is provided with vertical walls rising to the top level of the caisson, whereby communication is established between the upper and lower chambers. The hatchway is furnished with a valve closing or opening the division as required. The valve being closed, the pontoon or caisson is floated over the spot where a foundation or other work in water is required to be performed. The valve is then opened, and the water let into the upper chamber, which sinks the pontoon to the bottom, say to a depth of 20 feet, and when the water in the upper chamber is on a level with the water outside, the valve is shut and water is pumped into the upper chamber until it is filled up 10 feet above the level of the river or other water (and the upper chamber must always be left so filled up 10 feet above the level of the water), so that the 10 feet of water will cause a downward pressure equal to counteract the upward tendency of the pontoon caused by the withdrawal of water from the lower chamber. The extra weight of the upper chamber (which can be constructed larger in area than the lower chamber) will drive or force the lower edge of the pontoon down into the clay, and stanch the lower chamber, which is then to be pumped out dry, when the workmen may descend therein through the hatchway. The work being finished, water is let into the lower chamber and pumped out of the upper chamber, when the pontoon will rise.

Steam Engines.—This invention relates first to the application of certain apparatus between two cylinders, whereby motion may be communicated to an intermediate crank, while, at the same time, a parallel motion is secured for the rods of the two pistons. This apparatus consists of a fixed wheel with internal teeth, in gear with which is a pinion carried by the crank. To this pinion the piston rod is connected, and as the said pinion rolls round the internal teeth, the required parallel motion will be obtained. The cylinders above-named may both be steam cylinders, or one of them may be an air pump, or a force or lifting pump. Secondly, the invention consists in certain methods of constructing the above described parallel motion.

Apparatus for heating the Feed-water of Steam Boilers.—This invention consists in the application to a steam cylinder of two or more heater exhaust valves in addition to the ordinary condenser exhaust, and arranged in relation to the same and to the ordinary steam piston in such a manner that the heater exhaust will open with the usual lead of the exhaust valve into the condenser, the condenser exhaust waiting upon it such a period of time as in practice the greatest economy in the working of the engine will direct. By this arrangement a portion of the exhaust steam passes into the heater and raises the temperatnre of the feed water to nearly 212 degrees, or from 100 to 120 degrees above the usual temperature in the hot well, without obstructing in the least the motion of the pistion or the correct operation of any part of the engine, and by connecting the lower part of the steam chamber in the heater with the feed pump the heater is kept clear of water, and the boilers are supplied to the extent of condensation in the heater with fresh water.

Quicksilver--How to Test it and Detect Adulteration.

Quicksilver, after being extracted by the plain process of retorting, is seldom quite pure, and generally contains a small proportion of other metals. The eminent naturalist Priestly suggests a very simple method to purify mercury, by merely shaking it strongly in an iron flask, and renewing the air in the same repeatedly with a pair of bellows. By this manipulation a black powder will be formed on the surface, which can easily be separated. If no more of this dust is formed the quicksilver may be considered pure. In this state it will always give a clear sound when agitated in the flask, while an admixture of lead will make it sound dull, as if the vessel were made of potter's clay. It is often found in the market wilfully adulterated with lead, tin, and bismuth. Of lead, it can absorb or dissolve almost one-half of its weight, without losing much of its limpidity. This adulteration can easily be discovered by rubbing some of the metal on the open palm; if it soils the skin it is adultered—if pure it leaves no trace. Besides, if dosed with lead, it will leave a tail behind—"*il fait la queue*," to use a French expression—that is, the drops, instead of being globular, will assume an elongated form, and a more or less flattened surface. Some of these observations may be, perhaps, useful to the gold miner, as many complaints have latterly been heard about the impurity of the quicksilver sold in the mines, which fact is also proved by the frequent occurrence and admixture of base metal in the amalgam gold, probably, in most cases, by artificial means.

THE COFFEE BEAN.—Efforts are soon to be made to introduce the culture of the coffee bean into the Connecticut valley—a product that is said to be the best substitute for coffee yet discovered. Marsh Stiles, of New Ashford, in Berkshire county, Mass., has the seed, and it is believed that the article can be as profitably produced as tobacco.

[There is no question but that coffee will grow in that latitude, but the point is the flavor. Tea grows in Pennsylvania but it is very poor tea; tobacco grows in Connecticut and it is Connecticut tobacco not Havanna. Coffee grown in Massachusetts will doubtless be a substitute for the genuine article.—EDS.

THEY manufacture matches in San Francisco, which can be trodden upon or rolled under foot without igniting; and which after having been manufactured a month, may be immersed in water for ten or fifteen minutes, and when taken out will not only ignite but hold a flame. The wood used is "Port Orford cedar." They sell at wholesale for $1 70 per gross

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Self-fastening Skate.

Self-fastening skates, or those which are quickly secured to the foot by mechanical devices of one sort and another, have been very popular of late years. They have their advantages, for they dispense entirely with the use of straps, which many find objectionable, and leave the appearance of the boot unmarred; they are also easily put on and off.

The skate illustrated herewith is one of the best of this class that we have seen. It requires no plates let into the boot, or other appurtenances not usually attached to them. The skate iron is hinged to the foot plate, A, at B. The foot plate has a latch, C, riveted firmly to it, which slips over the iron, as at D, Fig. 2. This latch has a notch in it which the key, E, fits in, and is kept up to by the spring, F. When the skate is to be applied, the key, F, is pushed forward, when the skate iron falls down, as shown by the dotted lines. By placing the foot on the plate and lifting the skate iron up, the side-catches, G, are drawn together by the action of the spring, H, in the slotted plates, I, and the heel plate, J, thrown forward, so that the foot is grasped firmly as in a vise. In this manner the skate can be quickly put on and off. The inventor claims the following advantages for his invention:—

Fig. 1

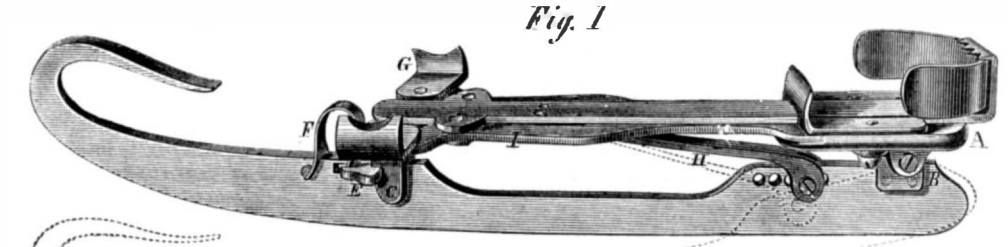
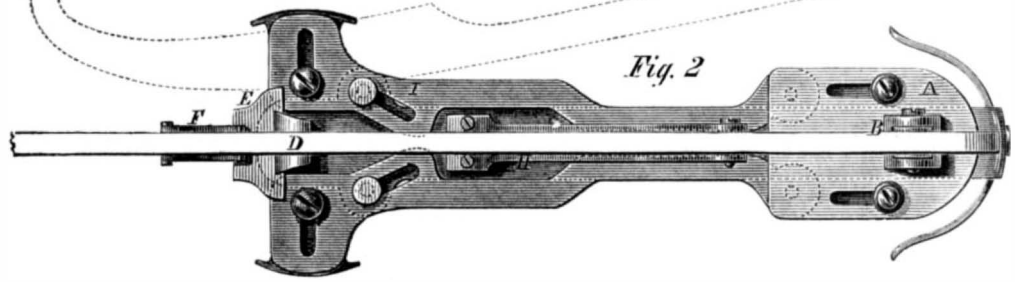


Fig. 2



FORBES'S SELF-FASTENING SKATE.

The skate is complete in itself, and as it is adjustable to various sizes of boots, may be kept in stock by all dealers. It is equally adapted to a light or heavy boot within all limits a person would use for skating. It is instantaneous in its application, being adjusted to fit the boot before leaving home The hands do not need to be uncovered to put it on or to remove it. It is extremely firm and comfortable on the foot. It is light and elegant in appearance, and the runner may be made of any of the various styles. It is easily manufactured, with but small facilities, being almost entirely struck out of steel, having no cast-iron in it, and no brass except the heel piece.

These skates are now being manufactured by the inventor at Halifax, N. S. He having sufficient market outside of the United States is willing to dispose of the patent right for one or the whole of the United States. It was patented through the Scientific American Patent Agency on the 1st of December, 1863. For particulars please address the inventor, John Forbes, care of Messrs. David Starr & Sons, Halifax, N. S.

A New Thermograph.

M. Marcy has addressed to the Academy of Sciences the following description of an instrument for marking small variations of temperature:—1. The first part of this thermograph consists of a copper tube a metre in length, the interior diameter of which is capillary, not being more than one-fifth of a millimetre. It is open at one end, and soldered to a hollow copper ball at the other end. 2. The second part of the apparatus consists of a wheel resting upon knife-edges, like those of a pair of scales, whereby a very delicate oscillation may be imparted to it. The axle of the wheel carries a long vertical needle, marking the degrees on a circular scale. To the circumference of the wheel is fixed a glass tube six millimetres in diameter, and bent in conformity to the curvature of the wheel, and so situated that the middle of the tube lies vertically underneath the needle when the wheel is at rest. One of its extremities is hermetically closed, while the other is open. Now, if a little mercury be poured into this tube it will settle at the lowest point, and the interior of the tube will thus be divided into two chambrs, one closed and with air confined in it, the other open. 3. Now introduce the copper tube into the glass one, giving it of course the same curvature, and so that ts extremity may pass through the mercury, thus establishing a communication between the hollow copper ball and the confined chambers, and the apparatus, with a few accessory appliances, will be complete. The end of the copper tube dipping into the mercury should be varnished to prevent its being attacked by the latter metal; or better still, the end might be made of platinum. 4. To use this apparatus, put your hand to the copper ball; the warmth thus imparted to it will dilate the air it contains, and drive part of it into the confined chamber; the mercury will therefore recede, and thereby make the wheel turn round its center of gravity; the very small arc thus described will be revealed by the needle, the difference of its present position with its previous one when at rest. If, on the contrary, the copper ball be cooled, by water for instance, the air inside will be contracted, a portion of the air of the confined chamber will rush in, and the mercury will be driven forward, the needle turning in the inverse direction. By means of this experiment very delicate physiological experiments on animal heat may be conducted.

THE "UNION" LAMP.

One of the greatest troubles connected with the use of kerosene lamps is the breakage of chimneys. When they are not cracked by heat, they fall off on

the slightest provocation, and the carrier of the lamp is left groping in darkness; for the ordinary burners, when deprived of their chimneys, give a feeble sputter, or spirt, and then the flame vanishes from the sight. This is not the case with this one. It needs no chimney to aid combustion, but by an ingenious arrangement of the several parts air is supplied to the wick and a draft created so that the flame is clear, smokeless, emits but little odor, and is steady. The wick in this lamp is flat, not round, and it is surrounded by a case, A, which is perforated with holes. In its passage through this case the air is highly heated, which result is also aided by the guard, B; this surrounds the wick on two sides and is also heated by the flame so that combustion is rendered more perfect. The longer this lamp burns and the hotter the parts near the wick become the better it will work. We have one of these lamps in use and find it exceedingly useful, we think it the best we have ever seen for the purpose. One thousand dozen of them have been ordered by one firm in London. This invention was patented in England, France, Belgium, Mexico, and the United States, and is manufactured by the Union Lamp Company, 259 Pearl street, New York, from whom all further information can be had.

To Make Good Cider.

Apples from which cider is made should not be permitted to fall to the ground, and thus become bruised and commence to decay before the grinding process.

The same care should be used in gathering apples or cider as for hoarding for fall and winter use.

The Harrison and Canfield apples are said to make the best cider, but are not desirable fruit for the table. We are very much in want of a barrel or two of good cider for home consumption, and any of our readers having the article for sale which has been made from good fruit, on scientific prinples, may find a customer by addressing the pubishers of this paper.

Prevention of Rust in Iron.

Many a valuable hint is to be obtained from an intelligent practical laboring man, which may lead the philosopher into a train of ideas that may, perhaps, result in discoveries or inventions of great importance. When bricklayers leave off work for a day or two, as from Saturday to Monday, they push their trowel in and out of the soft mortar, so that the bright steel may be smeared all over with a film of it, and find this plan an effectual remedy against rust. In Wren's "Parentalia" there is a passage bearing upon this subject:—"In taking out iron cramps and ties from stonework, at least 400 years old, which were so bedded in mortar that all air was perfectly excluded, the iron appeared as fresh as from the forge." Oxygen, which is the main cause of rust, is abundant in the composition of both water and the atmosphere; and that quick lime has an astonishing affinity for it is evinced in the homely practice of preserving polished steel or iron goods, such as fire-irons, fenders, and the fronts of "bright stoves," when not in use, by shaking a little powdered lime on them out of a muslin bag, which is found sufficient to prevent their rusting. Another instance, very different and far more delicate, bearing upon the same principles:—the manufacturers of needles, watch springs, cutlery, etc., generally introduce a small package of quicklime into the box or parcel with polished steel goods, as security from rust, before sending it to a distant consumer, or stowing it away for further use. These cases are extremely curious, because, as a general rule, bright steel or iron has a most powerful affinity for oxygen; consequently it is very readily acted upon by damp, and is rusted in a short time, either by decomposing the water and obtaining oxy gen from that source, or direct from the atmosphere. It is not absolutely essential that the quicklime should be in actual contact with the metal, but it somewhere near, as in the case of the parcel of lime packed up with the needles or watch springs, the bright metal will remain a long while without the least alteration in its appearance; the lime (which is already an oxyd of calcium) either receiving an additional dose of oxygen or being converted into a carbonate of lime.

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EXTENSION OF PATENTS—FOR WHOSE BENEFIT THEY ARE GRANTED.

There seems to be an impression among inventors that since the law of March 4, 1861, went into force the previous law, in respect to extending patents for seven years, was abrogated. This is not so in regard to cases which were patented under the old law. Any patent which was granted prior to March 4, 1861. may be extended for seven years on proper application to the Patent Office, provided the patentee has not already been amply remunerated for his invention and proves to the satisfaction of the Commissioner that he has used proper diligence in attempting to realize gains from his patent. The patentees of 1851 should lose no time in making out a statement of their profits and losses in consequence of their patents, and in seeing counsel in regard to an extension, if they wish the term of these expiring patents continued for another seven years.

It is often the case that the extended term of a patent produces to the patentee a ten-fold profit over the amount realized during the first fourteen years of its existence. The assignees of a patent cannot obtain this extension: it must be done at the instance of the inventor—or, if deceased, his heirs may apply for the extension, but in either case ninety days' notice of their intention should be given—for whose sole benefit it is granted.

For full particulars concerning extension, address

MUNN & CO.,
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37 Park Row, New York.

FINE TOOLS.

It is a trite saying that "a bad workman quarrels with his tools;" but a corollary ought to be added to this effect: "a good workman quarrels with bad tools." Watch-makers, engravers, mathematical instrument-makers, die-sinkers, model-makers, mechanical dentists, machinists, in fact all metal-workers, have occasion to use the best tools. They cannot always find time to make them, and as a consequence are obliged to resort to stores; this is all very natural and proper.

The intelligent American workman must have remarked the almost universal prevalence of foreign brands on fine tools and instruments of all kinds. Stubb's screw plates are the best in market. A bolt screwed in one of them *fits* the hole made by the tap, which is more than can be said of other brands. The threads are fine and well-proportioned; instead of being a shallow groove on the bolt it is clean and well defined. This is as it should be. The rimmers of this same brand are perfect tools. They are five-sided; in this form they are less likely to stick or jam, for one edge that cuts is always backed up by two other edges, so there are no two cutting opposite each other. They are so finely tempered that the sharp ends of the small sizes scratch glass, and they work in tough, unannealed steel without injury. Wherever we go we see the same articles inquired for. They have become standard, and men buy them because they know they will do good service.

Why do we not make our fine tools? Darling and Schwartz, of Bangor, Maine, make a steel scale which is both a straight edge and a rule, and is divided into very minute fractional parts of an inch. This tool cannot be excelled. J. R. Browne and Sharp, of Providence, R. I., make steel scales, wire gages, steel squares, and vernier callipers of excellent workmanship and material. Some few other firms make twist drills, of late, but beyond these there are few who manufacture fine machinists' or metal-workers' tools. The saws that jewellers use must return an immense profit. They are at present sold for five cents each, and it is manifest, from the burrs on the side of the blades, that the teeth are cut on hundreds of them at once. Indeed a planer bed or a milling machine might be stowed full of these things from end to end, so that they could be sold by the makers for a slight advance on the price of the raw material. Those used at present are of Swiss or French make.

Look at the countless array of tools wanted by mechanics. Small taps, screw plates, tap wrenches, rimmers, small hammers, screw-drivers, drills, and drill bows, or their equivalent, saws, mandrels of standard sizes, etc., etc. There is no need to specify the whole paraphanalia of the machinists' or metal-workers' bench. They ought to be made at home instead of being imported. These hints are for the benefit of whom it may concern. We should like to see American mechanics using American tools, and we are sure that any one having sufficient capital and patience enough to wait until he, or they, could make a market for their goods, would reap an ample fortune. Respecting the ability of our workmen to compete with foreign production there is no question. When we can make drills for musket cones, or watch pinions, that will drill 150 feet in steel, without being ground or tempered, we can make anything else of equal excellence that we choose to turn our hands to.

LOCATION OF STEAM GAGES AND INDICATORS

A correspondent informs us that he has two steam boilers connected by a pipe which is furnished with a stop valve for closing the communication between the boilers. He recently had the valve closed and found that the pressure in one boiler was 50 pounds to the square inch and in the other 20. On opening the valve the pressure immediately rose to 65 pounds. It would be interesting to have further particulars in regard to this experiment, but with our present light we are inclined to attribute the surprising result to the location of the gage in such position that it was acted upon by the current of steam in its passage from the high pressure boiler to the lower.

The action of currents of steam, though familiar to engineers in other situations, seems to have been strangely overlooked in its effect upon gages and indicators. Clark, in his most able work on the locomotive, states that repeated observations showed the pressure to be greater in the steam chest than in the boiler, and he remarks that from the carefulness with which the observation was made and the perfection of the instruments, it is as difficult to doubt the statement as it is to believe it. There may be difficulty in doubting the statement, but to believe it is simply impossible. Steam will not flow from a vessel of lower pressure into a vessel of higher pressure. There must have been some error in the observation, and a very probable cause of this was the location of the gage in such position that it received the impact of the swiftly moving current of steam which rushes from the boiler into the steam chest.

Currents of steam may operate not only to raise the mercury in a gage, but also to lower it so as to indicate no pressure whatever, even in engines working steam at a pressure of 30 or 40 pounds to the inch. This effect is produced by inserting the gage pipe at right angles to the current of steam, when the steam is drawn out of the pipe by the friction of the passing current, and we may even have the indication of a partial vacuum. This matter is worthy of attention on the part of the builders and runners of steam engines.

LIGHT WANTED.

Most of the Examiners in the several departments of the Patent Office keep their work well up, so that but a reasonable delay occurs between the filing of an application for a patent and the official decision. But there is one class of cases which is sadly neglected, and which, in behalf of inventors, we ask the Commissioner to have corrected. We refer to the class designated "Photics," *i. e.*, the room in which coal-oil and other lamps are attended to. Not a day passes but what one or more applicants for a patent in this line writes to us or calls at our office to inquire when his application for a patent, made months before, will be acted upon. A gentleman at the West, whose application for a lamp was filed in the Patent Office May 4, 1864, writes under date of October 31, as follows:—"I should like to know about my lamp application. The delay has been a serious injury to me. I should like to know at once what has been done in the matter. I have a matter to patent far more important than anything I have yet sent you, which I shall put in other hands unless I can learn something definite about my present application. It has been longer than I ever waited before for a decision after making an application."

This extract is a sample of letters of complaint we are constantly receiving from inventors who have cases pending in the "Photic" department. Will Commissioner Holloway see that the great coal-oil *consuming* interest is attended to?

WAR A STIMULANT TO INVENTION.

The impregnable fleets of ironclads which protect the waters of these United States might never have been but for the presence of war. Secure in its pacific policy the Government would have watched the progress of more belligerent nations toward building armored ships, without making a similar provision. Even after the war actually commenced it was hard to convince some officials that iron-clad ships were useful, and not until positive evidence was given of their necessity did Government set to work at them in earnest.

The case has been the same with breech-loading small arms. When the war is nearly ended these weapons are adopted on a large scale. From armored ships, and small arms in general, down to the most minute equipment of the soldier, this war has proved a spur to invention, and the result is well shown in the efficiency of our armies and the comfort of the men in the field.

It is not a comparative superiority over other nations that we enjoy in this respect, but a positive one. Neither is it necessary to condemn the Armstrong gun, already condemned in its own country, and vaunt the powers of the Parrott rifle, to prove our assertions. The Ericsson wrought-iron gun and the Rodman 1000-pounder can speak for themselves, but they would not have spoken for many years to come had not the war stimulated the inventors and projectors of these pieces of ordnance to put them to the test of actual duty.

Our country enters on a new era, with new systems in all of its several departments. The science of war itself has been changed, and tactics once thought necessary to the proper handling of troops in action are supplanted by less intricate ones. The professional soldier has learned something from the volunteer officer, and what the latter lacked in training has been supplied by his fertile invention, and a mind quick to comprehend situations and to make the most of them.

The arts languish when the torch of war blazes. Lured by its brilliancy men forsake peaceful callings and seek the imminent deadly breach. But the inventor makes men of iron and brass in their stead, whose muscles are tireless, and whose skill is unsurpassed. Where one man falls in the field forty rise up in the factory in the shape of useful machinery. But for this fact there could be no war, for our armies would go naked, hungry and athirst.

War is always the stimulant of invention, and the nation which has the clearest-headed men, and the

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most energetic, is the one that will win against all obstacles. Though the hills be levelled to the earth, and the forests be left smoldering piles, good shall come out of it. For where the wilderness made the earth desolate, villages shall smile, and mills hum where savages lurked. The fables of the Arabian nights are idle tales, but the deeds which modern ingenuity achieves are not less less wonderful, while they advance the interests of mankind.

MAKING SIRUP FROM CORN.

"A German chemist has discovered a process of making sirup from Indian corn—not the stalks but the grain. He gets between three and four gallons from a bushel, and it is worth $1 50 per gallon. A company has been formed to erect an establishment at once, and put the process in practical operation. All the stock is taken, two of our leading sugar dealers having subscribed $50,000 each, and others who are anxious to invest in the enterprise are unable to get a chance." Such is the story which is now being told by men of the highest respectability in this community.

Perhaps all this relates to something new, and perhaps not. If the German chemist spoken of has discovered a cheap process of making cane sugar from corn, he has made one of the greatest chemical discoveries of the age, but if he is merely changing starch into grape sugar he is accomplishing nothing more than has been done ever since the origin of the art of making fermented liquors from grain.

All of our grains contain a large proportion of starch, that in Indian corn being from 64 to 80 per cent. Starch can be converted into grape sugar by several methods. The cheapest and most common is by sprouting the grain. The sprout comes out of the end of the grain and turning back grows along its side. It is found that as the sprout grows, the starch opposite to it in the grain is changed into grape sugar. This process is employed in malting. In malting diastase is produced, and this substance has the property of changing starch to grape sugar. One pound of diastase will convert 1,000 pounds of *starch into sugar.*

Another method of converting starch into grape sugar is to steep it in dilute sulphuric acid, in the proportion of 10 parts of acid to 1,000 of water and 500 of starch. In this way there is no difficulty in obtaining pure grape sugar from pure starch. This is practised as a commercial industry in France and Germany, the sugar being used principally for adulterating cane sugar.

Grape sugar is that which is found on raisins. It is far less sweet than cane sugar; the proportion of its sweetening property being stated at about one-third.

Grape sugar can be made from cotton and linen fiber, and from wood, as well as from starch, by the same process of steeping in nitric or sulphuric acid. Last winter Prof. Seely, of this city, made quite a quantity from waste paper and saw-dust.

Cotton, linen, and wood fiber, starch, gum, and grape sugar are composed of the same elements, carbon, oxygen, and hydrogen, combined in the same proportions with a minute quantity of water, and hence it is not strange that they should be convertible into each other.

PURIFYING GAS BY OXIDE OF IRON.

When bituminous coal is placed in a close retort so as to be shielded from contact with the air, and its temperature is raised to a bright cherry red, it is decomposed, and its elements re-combine to form a great number of new substances. Among these are light and heavy carburetted hydrogen, and a number of volatile hydro-carbons, which mingled mechanically together constitute illuminating gas. There are also a number of hydro-carbons which by being cooled are condensed in the form of tar. Besides these, three gases are formed which will not condense in cooling, and which are so offensive and deleterious that if they could not be removed they would render coal gas unfit for use in our dwellings; these are ammonia, carbonic acid, and sulphuretted hydrogen. Fortunately ammonia has so strong affinity for water hat it is only necessary to expose the gas to a large surface of water to have all of the ammonia absorbed. Both of the other two impurities are eliminated by passing the gas through several thin beds of lime.

This is the plan in general use in this country, but in England a different method of extracting the sulphuretted hydrogen has been invented, and is rapidly extending. This consists in substituting for lime the hydrated oxide of iron.

Le Gaz says when sulphuretted hydrogen is brought in contact with hydrated oxide of iron both compounds are decomposed. The oxygen leaves the iron to combine with the hydrogen, and the sulphur combines with the iron, forming sulphide of iron. Consequently oxide of iron is an efficient medium for purifying illuminating gas of sulphuretted hydrogen. But the cost of oxide of iron would have precluded its use for this purpose were it not for the fact that by exposure of the sulphide of iron to the action of the atmosphere it is again converted into oxide of iron—the oxygen of the atmosphere displacing the sulphur. This action is sometimes so rapid as to heat the iron red hot.

It is only necessary, therefore, to expose the iron to the action of the atmosphere for it to become ready for use a second time; and thus it may be employed 30 or 40 times. The sulphur displaced remains mechanically mingled with the mass, increasing its weight by repeated use finally to the extent of 30 or 40 per cent.

The oxide of iron is employed in the form of coarse powder mingled with saw-dust, and is spread in beds 12 to 18 inches in thickness, in purifiers similar to those in which dry lime is employed. The gas must finally be passed through one thin layer of lime to take out the carbonic acid.

SECOND TRIAL OF THE 1,000-POUNDER.

A correspondent at Fort Hamilton sends us a full description of the first trial of the 20-inch gun, substantially the same as that already published, adding, however, the statement that at the last fire with 100 pounds of powder and 1,080-pound shot, and 25° elevation, the time of flight was 24 seconds, and the range between 3½ and 4 miles. He then says:—On the 27th the trial was continued. One charge was fired with 100 pounds of powder and 1,080-pound shot, elevation 0°, recoil 6 feet 10 inches; second, 125 pounds of powder and 1,080-pounds shot, elevation 0°, recoil 7 feet 5 inches; both shot fell about 600 or 800 yards distant; the first richocheted eight times, the second only five, owing to the rougher surface of the water. But one difficulty appeared; this had been anticipated ; the common friction primer was not sufficient to drive a flame through so long a channel of metal; the flame was chilled before it reached the powder. This caused a delay the first day, the vent having to be filled with fine powder to effect the discharge. This was obviated on the second day by a simple contrivance; the top of the vent was drilled out and tapped to receive a plug, over which were fitted two semi-cylinders which contained the friction primer with a small magazine filled with powder attached to it, over all was slipped a metallic ring to keep it together; this effected the desired result.

This gun is not to be fired again until some preparations are made to try the effect of the shot on a vessel which will be anchored at point blank range.

NEW BOOKS AND PUBLICATIONS.

The American Conflict. By Horace Greeley. J. G. Derby, General Agent, 5 Spruce street, New York.

When peace shall be restored to this now distracted country, when the great questions at issue are put to rest forever, there will be many who will wish to know the cause, the course, and the complete history of the events which are now transpiring. Truly, as has been often said during this struggle, we are making history; but even the lover of his country, not counting the half-hearted or the indifferent, is busy buying and selling, and knows nothing of what is transpiring in war except as he reads the daily journals, or sees eager crowds jostling each other at the bulletin boards.

It is to his countrymen that Horace Greeley addresses himself, though the work is dedicated to John Bright; and the great demand for the book proves the interest taken in it. In the usual preface, which Mr. Greeley, with a touch of humor, styles "Preliminary Egotism," the scope of the work is shadowed forth. The author says therein: "What I have aimed to do is so to arrange the material facts, and so to embody the more essential documents, or parts of documents, illustrating these facts, that the attentive intelligent reader may learn from this work, not only what were the leading incidents of our civil war, but its causes, incitements, and the inevitable sequences whereby ideas proved the germ of events."

Much more is also added, but this must suffice. From the first volume sent us we find that the performance is equal to the promise, thus far, and although the illustrations are not the best, still there is a fund of information upon the great rebellion which is invaluable. O. D. Case & Co., of Hartford, Conn., Publishers.

THE ROCKS IN WHICH PETROLEUM IS FOUND.

For the Scientific American.

Messrs. Editors:—In Vol. III. (New Series), page 270, you published an article by me on the geological distribution of petroleum in the United States. Inasmuch as the most crude and erroneous notions and opinions still prevail, and are inculcated upon this subject, leading to vain expenditures of time and money, and vexatious looking for similarity in geological strata, where none can possibly exist, I wish in the present communication to enlarge upon this subject, and show how fully the geological science of our country has been sustained by the oily developments of the last five years.

The lowest geological horizon, or stratum, in which petroleum is found of commercial importance, is in Canada, at Enniskillen, near Lake St. Clair. The oil is in the corniferous limestone, which is largely composed of fragments of corals, with sea shells cemented together. The cavities of these corals and sea shells are often filled with liquid bitumen, which distills from them, as can be seen in the walls of the Second Presbyterian Church, in Chicago. This limestone in the United States is in its maximum about 350 or 400 feet thick. Immediately overlying the limestone is the marcellus shale, which is so highly charged with bitumen as to lead to great expenditures of time and money in vainly looking for coal in it. It is about 50 feet thick in Canada. These two rock formations, then, which in Canada are not over 150 feet in thickness, are the reservoirs, holding rock oil, however and whenever formed, in that country.

Ascending in the geological scale, and passing over into New York, the next stratum of rock yielding bitumen, oil and gas, is there known as the Hamilton Group, about 1,000 feet thick. The oil springs of Western New York, along the banks of its numerous lakes, are mainly in this group of rocks. They have as yet yielded oil only in small quantities for medicinal purposes. But they afford ample scope and verge for exploration.

Above this group succeed black shales, known as the Gennessee Slate, 300 feet thick. The wells of Mecca, Ohio, and others of that region are most probably in this rock. Above the Gennessee Slate comes in the Portage Group of slates and sandstones, 1,700 feet thick. The deeper weels of Oil Creek, Pa., will reach the sandstones of this group.

Still above lie the rocks of the Chemung Group, which are mainly composed of thin-bedded slates and limestones. In its maximum it is 3,200 feet thick, but in Western New York and Pennsylvania it is much thinner, being only about 1,000 feet thick. Much of the oil of Oil Creek is from this group; 400 and 500 feet of it are seen in the cliffs and hills of Oil Creek, the Alleghany River and its tributaries above, and in Venango County.

Measured in the maximum development of all the rocks enumerated we find between the oil of Canada and Venango County, Pa., 6,000 to 7,000 feet of sedementary rock, all of which bear the appearance of having been deposited in sea water. The entire group of rocks enumerated are known as the Devonian Series in England. The oil springs of Eastern Canada and New Brunswick, along the Gulf of Newfoundland, are in the upper members of this series.

In treating of a subject of so vast importance as the one under discussion, and which is now so largely engrossing the monetary circles of our country, and giving to one State from production and manufacture a sum total of $51,000,000—the growth of the last

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five years—we should enlarge our scope of observation and corresponding powers of analyzing and generalization.

Leaving for the present those portions of the United States where oil has been most successfully found, and before coming into the geological strata of the thick and heavy oils, we have on the eastern flanks of the Appalachain Mountains, in Pennsylvania and Virginia, 5,000 feet of the Catskill group of rocks. (Ponent of Prof. Rogers.) Lapping around the southern outcrop of the coal measures of Tennessee, Kentucky and Illinois there are 200 feet of the lower carboniferous and 3,000 feet of the middle carboniferous. (Umbral of Rogers.) A total in the aggregate, as measured in Nova Scotia and the United States, of 1,500 feet. Throughout the whole of the series oil and gas springs are found.

We now come into the true coal measures. These are divided into lower, middle, barren measures and upper, a total of the bituminous portion of 2,500 feet.

The lowest member of the coal series caps the highest hills, near the mouth of Oil Creek, and lies about 600 feet above the bed of the creek, or 1,300 feet above the third sand rock, which is the most abundant oil-producing stratum.

At the Kiskiminetas, Slippery Rock, Butler Co., Pa., Beaver & Smith's Ferry, oil is in the lower coal measures—800 feet thick. High up the Kiskiminetas and on the Monongahela River, oil is found in the middle coal series 1,000 feet thick. At Marietta, Ohio, and in the oil region around the strata of the upper coal are the productive series.

To conclude, then, oil is found through 24,000 feet of rocks, as measured vertically in the geological scale, and geographically from Nova Scotia to Lake St. Clair, and from Virginia to Tennessee River. The geographical area, covered by the oil-bearing group of rocks in the United States, Canada, New Brunswick and Nova Scotia cannot be less than 200,000 square miles.

Over this area, wherever oil and gas springs are found, there we may reasonably hope for success in boring deeply for oil. But oil and gas springs are not always sure indications of subterraneous supplies of oil in their immediate vicinity, for the course the fluids may have pursued from deep depths to the surface may have been very tortuous. Neither is the absence of such springs absolute negative proof of oleaginous accumulations beneath, for in many very notable instances, such as the lower portion of Oil Creek, and at Smith's Ferry on the Ohio River, very copious fountains were struck where no surface signs were visible.

I deduce the following practical and economical conclusions:—

First, Each widely-separated locality must be governed by its own laws as developed by boring and observation.

Second, Each geological horizon or stratum of oil-bearing rock received its supply, not from another, but from causes operating at the time of its own deposition.

Third, There is not now any reproduction of oil, but we are drawing from fountains filled of old.

Fourth, No stratum of rock is so thoroughly saturated with oil as to form a subterranean sheet or belt of rocks where petroleum is surely to be found, but in frequently isolated cavities, or fissures, at various depths and of various sizes, and containing diverse grades of oils. R. P. S.

A NEW ELECTRIC ANNUNCIATOR.

Mr. Thomas Taylor, of Washington, D. C., has sent us a description of a new annunciator, which we publish below. He says:—

"I was invited the other day by a friend to witness a few experiments in the telegraphing line, by means of a very simply-constructed device, and named by the inventor, 'Electric Annunciator.' It is on private exhibition at the Smithsonian Institute, Washington, and was constructed and invented by Mr. John Blackie, recently of Scotland. The object of this invention is to enable the pilot of a vessel to communicate with the engineer or helmsman, whereby prompt and efficient orders may be transmitted. One most valuable feature of the device consists in the fact that every movement of the rudder is made known to the pilot or Captain in their respective apartments, day or night. The *Great Eastern* was in the trough of the sea ten hours before the Captain was aware that the shaft of the rudder was broken. The value of this instrument may be inferred from the fact that the annunciator would have informed him the moment the accident occurred; for it not only informs the pilot of the Captain's wishes, but also communicates the pilot's orders to the engineer and helmsman. Further: it informs the Captain whether his orders have been obeyed; the rudder itself giving the information by means of a different galvanometer. When the pilot sends an order he presses a knob and a bell rings, meaning attention. The engineer looks to the index, which resembles a clock face, on which are printed the 5 general orders used, viz:—stop; ahead easy; ahead full speed; back easy; back full speed. The pointer indicates the order, and always remains at the last, and is locked. The device by which the pilot transmits his orders to the engineer is constructed as follows:—First, there is a dial on which the five orders described are printed. A pointer, like the hand of a clock, moves at the will of the pilot from order to order. The pointer is attached to a cylinder of iron 4½ inches long, ½ inch diameter, which leads from the center of the dial backward at right angles, and is supported at each end eccentrically. On each side are two electro-magnets and one underneath; there being one magnet for each order. A wire from each magnet leads to the pilot-house, and all wires are connected with a battery. By means of five knobs in the pilot-house the connections are made—one on each wire. The iron cylinder, or keeper, moves from side to side, or downward, according to the attraction of the magnet, and as the pointer is attached to the keeper or cylinder, the movements on the dial will correspond with movements of the keeper, by reason of its eccentric motions. It is stated on good authority that four-fifths of the collisions on our rivers are caused by the present mode of signalizing by bells. The pilot rings to stop, and in an instant he may discover that he should proceed, and rings again, but the two orders are combined in one, and it may be forming one order in itself, to the engineer, yet having no relation to the pilot's order, first or last. The prompt action of the engineer increases the confusion, and before it can be rectified a collision takes place. Our late sea-fights at Mobile will suggest to any one the necessity of some brief yet more perfect mode of conveying positive information between the commander, pilot and engineer than ringing a bell. One false move may be the destruction of many lives and much property, and cause terrible disaster to the nation.

"I shall now describe the mode of arrangement by which the Captain or pilot may understand the movements of the rudder while in their respective departments. I shall first describe the arrangement of wires, etc., then the mode of attaining results. From the battery to the rudder head a wire is led. From the rudder head to the cabin two wires are led, and from thence to the battery one wire is led and connected. I shall now describe the arrangements in the cabin. Each of the two wires mentioned terminates in a coil, but they are wound up in opposite directions; each coil is placed on the top of the other and in contact (insulating wire is used), the two ends are left out, and connected here with the third wire which leads to the battery. The coil is of oval form, about 4½ inches long and 2 inches wide. A magnetized needle is suspended in the center; a dial is also used, to which the needle points. This combination forms a differential galvanometer. I shall now describe the combination at the rudder head. A coil of wire like a bell spring, say 6 inches long and ⅜ inches in diameter, connects the two wires alluded to previously, which lead to the cabin. The third wire is connected to a roller which rests on the coil at right angles to it, but this roller is connected with the rudder head in such a manner that when the rudder moves from side to side, the roller will move from end to end of the coil, and in contact. The only use of the wire being in coil form is to have a long piece of wire in a short compass. This completes the arrangements. The battery being in action, a current will pass from the battery to the rudder head, conducted by the roller to the coil. If the roller is in the center the current will split, and one-half go by each wire to the cabin, and as the two coils are wound up in different directions one current will traverse in one direction, and the other in another, but of equal strength. The needle, therefore, will stand perpendicularly. But should the roller move to one end of the coil, by a movement of the rudder, the greater part of the current will take the shorter route, and the needle will be deflected say to the right. A movement to the other end of the coil will cause a deflection to the left for the like reason. It will at once be seen that intermediate movements on the coil will cause corresponding movements of the needle. Thus every movement of the galvanometer indicates every movement of the rudder.

THOMAS TAYLOR.

Washington, D. C., Oct. 16, 1864.

ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING NOVEMBER 1, 1864.

Reported Officially for the Scientific American.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

44,844.—Apparatus for Raising Grates.—Isaac W. Allyn, Philadelphia, Pa.:

I claim the cam-shaped levers, F, hung to the sides of the fireplace and operating on the horizontal grate of a stove or range, substantially as and for the purpose herein set forth.

44,845.—Corn Planter.—Daniel W. Amos, Bedford, Pa.:

I claim the combination of the indented driving-wheel, the gearing, the reciprocating feeding mechanism, and the cut-off with the seed tubes, substantially in the manner described, for the purpose of feeding the corn grain by grain, and securing an accurate register between the planting and covering devices, as set forth.

44,846.—Steam Engine.—Sol. Andrews, Jr., Westfield, N. Y.:

I claim, first, The return of caloric from the exhaust steam to the steam or water spaces of a steam boiler or steam and water passages of steam engines by means of atmospheric air.

Second, Forcing air into the steam or water spaces of a steam boiler or steam and water passages of steam engines by means of an air pump in combination with the air tube and exhaust pipe, substantially as set forth.

Third, The heating of air on its passage from the pump to the steam or water spaces of a steam boiler, or steam and water passages of steam engines by the waste heat of the exhaust steam.

Fourth, The construction and arrangement of the parts hereinbefore described for the purpose of increasing the power of a steam engine and the saving of fuel, and the production of fresh water from salt water for drinking and other purposes, or for other purpose on the working of a marine engine without additional expense for such a purpose or loss of power to the engine.

44,847.—Harvesting Machine.—Wm. B. Birdsall & Edwin H. Cogswell, Hudson, Mich.:

We claim the arrangement of the rake-heads, m, constructed and operating as described in relation to the stand, B, and the dumper, M, substantially as and for the purpose herein set forth.

44,848.—Cover for Milk Cans.—Albert Brightman, New Bedford, Mass.:

I claim a tubular ventilating handle for a milk or other can, constructed and operating substantially as set forth.

44,849.—Balanced Slide Valve.—Alexander Buchanan, New York City:

I claim, first, The attachment of the valve cover to the back or cover of the steam chest by means of hooks, l l, and eye-bolts, m m, or their equivalents, substantially as and for the purpose herein specified.

Second, The attachment of the valve cover to one end of the steam-chest by braces having flexible connections which permit the cover to rise from the valve, substantially as and for the purpose herein specified.

[This invention relates to the protection of the back of the valve from the pressure of the steam by means of a valve cover attached to the back or cover of the valve chest, and it consists in a novel mode of supporting and sustaining such valve cover whereby it is enabled to adapt itself to the back of the valve in such manner that the valve will work against it perfectly steam-tight but without binding or unnecessary friction, and that in case of the engine being suddenly reversed the valve may be permitted to be lifted off the seat and thereby prevent the compression of any steam that may have been shut in the cylinder.]

44,850.—Sugar Evaporator.—Harlow Butler, Chesterfield, Ohio:

I claim, first, The use of the clarifying receiver, I, or a tall narrow vessel for receiving and clarifying the already heated juice, the scum rising and flowing off by a spout, whilst the percipitate falls below the insertion of the discharge pipe for the thus clarified juice, substantially in the manner and for the purposes set forth.

Second, The combination and arrangement of the worm, H, the receiver, I, with the discharge tube, K, and the evaporating chamber, C, substantially as specified.

44,851.—Ice Cream Machine.—John R. Champlin, Laconia, N. H.:

I claim the combined arrangement of the coupling devices whereby the whole freezing apparatus is readily coupled to the driving gear, and as readily removed therefrom, substantially as and for the purpose herein specified.

I also claim the construction and arrangement of the adjustable scrapers, P P, of the beater, substantially as and for the purposes herein set forth.

I also claim the combined arrangement and construction of the two scrapers or scoops, R S, being concave in front, and having their lower edges most advanced in combination with the side scrapers, P P, substantially as and for the purpose herein specified.

44,852.—Stopper for Jars.—G. F. J. Colburn, Newark, N. J.:

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I claim a stopper, B, of glass, or other suitable material provided with a suitable packing, C, when used in combination with a central opening, d, communicating with the interior of the jar and provided with a cork, D, or its equivalent, all arranged substantially as and for the purpose set forth.

44,853.—Coat and Hat Hook.—G. F. J. Colburn, Newark, N. J.:

I claim the I-shaped or grooved slip or rail, A, applied in combination with the U-shaped or double U-shaped bracket, B, or their equivalent, a plain square rail and loop and hook, C, in the manner and for the purpose substantially as set forth.

[This invention consists in a square or T-shaped rail or slip of wood or other suitable material fastened to the wall and applied in combination with a U-shaped or angular bracket attached to or cast solid with a coat and hook in such a manner that when said T-shaped slip is secured in the desired locality to a wall, any desired number of hooks can be readily slid on it and adjusted at the desired distance apart and whenever it may be desirable, said hooks can be removed instantaneously without disturbing the rail or removing a screw. Suitable side flanges projecting from the V-shaped bracket afford the opportunity to secure the hook by means of screws in the ordinary manner.]

44,854.—Making Shoe Nails.—J. Phelps Davis, Middletown, Conn.:

I claim as a new article of manufacture a shoe nail, constructed in the manner and by the process herein described.

44,855.—Telegraphic Instrument.—Samuel F. Day, Ballston Spar, N. Y.:

I claim, first, The combination of the lever, G, connecting wires, o p and m, or their equivalent, magnet, B, one or more of the magnets, P, and the sounder or registering lever in the manner hereinbefore described and without the intervention of a local battery between the repeating or relay magnet, B, and the sounding or registering magnets, P, that is to say, in such a manner as to completely break the circuit through the magnet or magnets, P, by which the sounder or registering lever is operated, and the circuit around them alternately, by means of the pulsations produced in the line current by the direct action of the operating key, substantially as herein set forth, and without changing the direction of the current upon the line wire or breaking the connection of the line by the action of the parts composing this combination.

Second, The combination of the shifting lever, G, springs, e and f, brackets, D and E, or their equivalent magnet or magnets, P, and the sounder or registering lever, substantially in the manner hereinbefore described, that is to say; in such a manner as to continue the circuit in one of these directions till the connection in the other is fully made, and without changing the direction of the circuit or current through the line wire or diverting it therefrom by its operation, substantially as and for the purpose hereinbefore set forth.

Third, The combination of the magnet, Q, the registering lever or sounder, and the magnet or magnets, P, when the said magnets are so connected to the current through which the message is received from the operating key that the pulsations of the said current are made to change its direction so as to send it through the magnet or magnets, P, and through the magnet, Q, alternately, thereby causing the same direction of current upon the line to attract the sounder or registering lever in opposite directions, substantially as and for the purpose hereinbefore set forth.

44,856.—Tool for Opening Tin Cans.—Wm. C. Dick. New York City:

I claim a tool, A, provided with a pointed cutting blade, D, and grooved jaw, E, substantially as and for the purpose herein shown and described.

[This invention consists in the employment or use of a tool provided with a pointed cutting blade applied to one shank or jaw of the same, and with a grooved jaw attached to its other shank in such a manner that the pointed cutting blade can be easily run through the top or any other part of a tin can, and by the action of its cutting edge against the grooves of the other jaw the sheet metal is readily and easily broken, and a hole can thus be cut in the can large enough to give access to its contents.]

44,857.—Harvester.—John H. Edward, Ottawa, Ill.:

I claim supporting the main axle of the driving wheels, C, by a pair of hinged levers, E, whereby said axle and its driving wheels can be thrown forward and backward, substantially in the manner and for the purposes described.

I also claim in combination with the loose pinion, F, the double-spring pawl, O, when provided with the wedged-shaped projection, q, so as to make it reversable, substantially in the manner and for the purpose herein described.

44,858.—Reaping Machine.—John H. Edward, Ottawa Ill.:

I claim the combination of the rollers, K H and L, and their endless belts when the same are operated by the supporting wheel, C, of the platform and independently of the main driving wheels of the machine, substantially as herein described.

I also claim the application to the rear side of the platform of two supporting wheels, C Q, one being a swivel wheel the other a fixed wheel, substantially in the manner and for the purposes described.

I also claim the combination of the rollers, K H L, and their endless aprons with the hooks, X and U, when constructed and operated substantially in the manner and for the purposes described.

44,859.—Lock.—Philo S. Felter, Cincinnatus, N. Y.:

I claim, first, The constructing of the tumblers, E, of two parts, c d, connected together by fixed buttons, f, and adjustable or turn buttons, g, provided with square holes, i, to be operated upon by a key, G, substantially as and for the purpose herein set forth.

Second, The circular disk, D, in combination with the circular tumblers, E, when the latter are rather less in diameter than the former, and both used in connection with the dog, H, for the purpose specified.

44,860.—Sash-holder.—Jacob Frick, Philadelphia, Pa.:

I claim the plate, E, its spring, d, and the lever, F, having the arms, a and b, and weighted arm, c, the whole being constructed and applied to a sash, substantially as set forth.

44,861.—Combined Time and Concussion Fuse.—Wm. F. Goodwin, Powhatan, Ohio:

I claim, first, The combination of the annular or Bormann time fuse, B, the chambers, C O′, the solid sliding disk, D, and the apertures, a1 a2 a3, all arranged and operating as and for the purposes specified.

Second, In combination with the above I further claim the friction primer, b1 b b2, and apertures, a, constituted and adapted to operate substantially as set forth.

44,862.—Pneumatic Drill.—Stuart Gwynn, New York City:

I claim the employment in machines for drilling rocks by means of steam or compressed air of a hollow piston rod to contain the drill or tool, or the drill or tool-holder.

Also the combination in one machine of the following elements:—1. A cylinder, piston, and hollow piston rod, the latter containing the drill or drill-holder; 2. A feed mechanism to cause the tool or tool-holder to advance as the work progresses; 3. A mechanism for rotating the drill during its operation.

Also the combination with a drill, of machinery whereby it may be operated by direct action of steam or other elastic fluid, substantially as herein described.

44,863.—Smoking Pipe.—Holman J. Hale, New York City

I claim, first, The radiator, S, constructed and applied to a tobacco pipe, substantially as and for the purpose above described.

Second, I also claim the combination of the radiator with the smoke tube, e, of the pipe, substantially as above described.

44.864.—Barrel.—John Harris, London, England:

I claim the arched truss, B, applied in combination with the head of a cask or barrel, in the manner and for the purpose substantially as set forth.

[The object of this invention is to truss or strengthen the heads of beer and other casks so that said heads are able to withstand the heaviest pressure from the inside and outside to which they may be exposed without leakage.]

44,865.—Nutmeg Grater.—Hiram H. Herrick, Boston, Mass.:

I claim the brush, G, operated in the manner and for the purpose substantially as herein set forth.

44,866.—Sash Balance.—Andrew B. Hester, Kent, Ind.:

I claim the cap or shield, A, enclosing a roller, d and a forked lever, e g h, in combination with the pulleys, B C, and cord thereunto attached, in the manner and for the purpose described in the specification.

44,867.—Water Elevator.—James M. Hunter, Greene, N. Y.:

I claim, first, In a water elevator making the friction clutch, which communicates the motion of the crank to the windlass, operate also as a brake when the crank is released, by means of the spiral spring, e, the arm, g, of the crank and the vibrating lever, d, substantially as above described.

Second, The combination of the friction wheel, C, the clutch-arms, D D, the vibrating lever, d, and the slotted arm, g, of the crank with the windlass of a water elevator, substantially as above described.

44,868.—Breech-loading Fire-arm.—Wm. Johnston, Cincinnati, Ohio:

I claim, first, The cam, a1, employed in connection with a circulating pin, g3, and a bar or bars, G G2, and the bar, G2, and spring, I, (or springs, I i, Fig. 9) to effect the projection and retraction of the cartridge shell ejector during the movement which the barrel undergoes in being opened to receive its charge, substantially as and for the purposes explained.

Second, I claim forming the cam, a1, on a removable collar, A2, for the purpose of adapting said cam to be readily and cheaply replaced as herein set forth.

Third, I claim the arrangement of the retracting bar (or bars) G G1, the bar, G2, and spring, I (or springs, I i, Fig. 9) whereby the forward and backward movements of the circulating pin, g3, are made available in projecting and retracting the ejector.

44,869.—Lock.—Wm. Jones, Brooklyn, N. Y.:

I claim, first, The circular socket, E, for the reception of the lock and the pivot, f, attaching the hasp, in combination with each other and with the circular form of the lock attached to the hasp, substantially as and for the purpose herein described.

Second, The revolving bolt, F, with its notched and flanged disk, H, applied and operating substantially as and for the purpose set forth.

Third, The tumbler, I, combined with the revolving bolt by means of a notched guard plate, L, substantially as herein set forth.

44,870.—Planing Machine.—Samuel U. King, Windsor, Vt.:

I claim as my invention, the machine or combination of mechanical elements, as follows, viz:—The cutter wheel, G, the carriage, H, the ways, I I (inclined with respect to the cutter shaft in manner as specified), the main or auxiliary rests, K M, the presser, L, the self-adjusting back support, O, and the adjustable bar, N, the same being arranged together and having operating mechanism, substantially as specified.

And I also claim the auxiliary rest, M, as made so as to be expansible with reference to the cutters, in manner and for the purpose as set forth.

And I also claim the combination of the "wener," P, with the rotary cutter wheel, the carriage and its ways (inclined with respect to the shaft in manner as specified), the main and auxiliary rests and the presser

44.871.—Machine for making Paper Collars.—George W. Livermore, Cambridge, Mass.:

I claim the feeding nippers, p q, in combination with the cutting out dies, the presser plate, g, and table, h, operating substantially as set forth for the purpose specified.

44,872.—Reduction of Iron and other Ores.—Heman S. Lucas, Chester, Mass.:

I claim, as an improvement in the manufacture of iron from its ore, the use of the compound, in the condition and substantially as specified.

74,873.—Soda-water Apparatus.—John D. Lynde, Philadelphia, Pa.:

I claim, first, The construction of the body of the fountain, with a movable dishing bottom, as per Fig. 1, the said body being drawn in or depressed at the flange so that the flange, at its point of connection with the fountain, shall be less in diameter than the largest lateral diameter of the fountain.

Second, The conducting tube, Fig. 3, made as described.

Third, The sirup-holder of glass, Fig. 2, as described, with a device of any kind for drawing the sirup, in combination with the screw mouth-piece, h.

44,874.—Metal-ruler.—Robert F. Macoy and H. L. Herwig, New York City:

We claim the metal-ruler, constructed as and for the purposes set forth.

We also claim forming a gutter, as specified, in the edge of the ruler having its rear portion below the first edge thereof, so as to receive and hold any fluid deposited therein by gravitation, as herein specified.

44,875.—Coal Scuttle.—Thomas T. Markland, Jr., Philadelphia, Pa.:

I claim combining the wooden base, B, constructed substantially as described, with the body, A, of the scuttle, as above specified.

44,876.—Device for raising Water.—Joseph McKnight, Pomeroy, Ohio:

I claim the steam induction pipe, C, and water eduction pipe, D, connected with the chamber, A, constructed and arranged to operate as and for the purpose herein set forth.

[This invention consists in raising water by means of steam passing down through a suitable pipe into a chamber at the bottom of the well or reservoir containing the water to be elevated, said chamber communicating with the water in the well or reservoir, and having a discharge tube communicating with it which extends upward to the top of the well or reservoir, to the point where the water is to be discharged.]

44,877.—Steam Generator.—Moses Merryweather, Richard Moses Merryweather, and Edward Field, London, England. Patented in England Nov. 1, 1862:

We claim, first, The use or employment (in apparatus employed for heating fluids by double tubes) of trumpet mouths, or other equivalently-formed guides or deflectors, for the purpose of preventing the interference of the ascending and descending currents with each other, and insuring a steady and sufficient circulation through the tubes, substantially as described.

Second, The use or employment of a baffle plate, formed as a box or chest, through which steam is passed for the purpose of preserving such plate from injury by the flame and gases acting against it, substantially as described.

44,878.—Ejector for Oil Wells.—George M. Mowbray, Titusville, Pa.:

I claim, first, The wings or flanges, F, substantially as above described and for the purposes set forth.

Second, I claim the tripod, or its equivalent, attached to a rod or pipe, with feet thereon, resting on the ground at the bottom of a well whereby to support the air tube and its attachments and maintain the cup in a fixed position while the adjustment is being made, substantially as described and for the purposes set forth.

44,879.—Pump.—William B. Munger, Hillsdale, Mich.:

I claim the apparatus for raising water from mines and other places by means of two or more series of pumps, arranged so that two pumps shall work with the same connections at each successive elevation or in each series, substantially as above described.

[The object of this invention is to provide means for raising water from mines and other low places by a series of pumps and reservoirs arranged at different hights above each other, all connected together and driven from the same shaft, so as to economize machinery and attendance.]

44,880.—Lightning Conductor.—David Munson, Indianapolis, Ind.:

I claim the electrical conductor, constructed substantially as described for the purposes set forth.

44,881.—Tuyer.—S. R. Niles, Rawsonville, Mich. Antedated Nov. 8, 1861:

I claim, first, The employment of the movable bottom, a, in combination with lever, b, substantially in the manner and for the purpose specified.

Second, I claim damper, d, lever, f, movable bottom, a, lever, b, and top, c, when all shall be constructed and arranged in the manner and for the purpose described.

44,882.—Smoking Pipe.—Rufus Norwood, Baltimore, Md.:

I claim, first, A pipe which is constructed with a sliding stem, B, having a hollow chamber which serves as a filtering or condensing chamber, b, within the bowl of the pipe, substantially as described.

Second, The combination of the chambered plunger b, and tube, c, substantially as and for the purpose described.

44,883.—Apparatus for Carburetting Air.—George Odiorne, Boston, Mass.:

I claim, first, The air forcing apparatus herein described, the same consisting of a hollow drum having a series of buckets or chambers arranged upon the periphery of the same and communicating with the interior thereof, all as specified.

Second, I claim the combination of the air forcing apparatus and float, arranged and operating with regard to each other, as described.

44,884.—Automatic Regulator.—James M. Osgood, Somerville, Mass.:

I claim an automatic regulator operating by the pressure of ai gas, or vapor, upon a column of fluid, substantially as described.

44,885.—Circular Knitting Machine.—Samuel L. Otis, Manchester, Conn.:

I claim, first, The cams, D E, and cam groove, d, in combination with the main needles, b, and casting-off needles, f, constructed and operating in the manner and for the purpose substantially as herein shown and described.

Second, The shoe, G, applied in combination with the needles, b, needle-bed, A, and stationary top plate, B, substantially in the manner and for the purpose set forth.

44,886.—Egg-fryer.—Addison Overbagh, Hudson, N. Y.:

I claim combining and arranging several distinct cup-like depressions, a a a, etc., of uniform depth, in one pan or spider having perpandicular sides and flat bottoms, in the manner and for the purpose set forth.

44,887.—Bureau Bedstead.—Frederick C. Payne, New York City:

I claim the combination of the hinged front board, D, folding frame, E F, hinged legs, h h, hinged standard, h, hinged top piece, B, and lugs, e e, substantially as herein set forth.

44,888.—Combined Steam and Hot Air Heating Apparatus.—Leonard Phleger, Philadelphia, Pa.:

I claim, first, A fire-box composed of i-shaped hollow water bars, substantially as and for the purpose described.

Second, I also claim the combination of the fire-box with the jacketed or enclosed inclined air tubes or passages, substantially as and for the purpose described.

Third, I also claim the combination of the fire-box with the hot air tube and with a steam boiler, when so arranged as that the heated air through the tubes and that heated in the boiler chamber, shall commingle in a common chamber, and thus pass off to the room or apartment to be heated, substantially as described.

44,889.—Sewing Machine.—William Preiss, New York City:

I claim the plate, A, in combination with the bar, B, and removable plate of a sewing machine, substantially as described and for the purpose set forth.

44,890.—Photographic Album.—C. E. Pretal, New York City:

I claim the construction of a photographic album, substantially as above described, in which all the leaves are hinged and turn upon a single pin or pivot, and also the arrangement for opening and closing the apertures for the admission of the pictures.

I also claim the construction of the joint by which the leaves are attached to the hinges, as above described.

44,891.—Double-acting Submerged Pump.—Andrew Reynolds, Sturgis, Mich.:

I claim the cylinder, A, provided with the two ball valves, B and C, in combination with the water passages, D D and d, all arranged to operate in connection with a double-acting hollow discharging piston, as and for the purposes herein set forth.

44,892.—Blower Case.—P. H. Roots, Connersville, Ind.:

I claim a case for blowers composed of two semi-cylindrical shells, A A, connected at the desired distance apart by plates, B B, as set forth

[This invention relates to a new and improved manner of constructing a case for a blower, which was patented by this inventor Sept. 25th, 1860.]

44,893.—Harvester.—J. F. Seiberling, Doylestown, Ohio:

I claim, first, The rubber spring, K, in combination with the double pulley, E and F when used between the pulleys, C and G, substantially in the manner and for the purposes set forth.

Second, I claim the use of the adjustable stop, h, in combination with the shoe and the notches, e, for adjusting the track-clearer to any desired hight, substantially in the manner and for the purposes set forth

44,894.—Harvester.—J. F. Seiberling, Doylestown, Ohio:

I claim, first, The crooked brace, P, in combination with the coupling piece, O, the short brace bar, T, and the shoe, S, when constructed and arranged substantially as set forth.

Second, I claim adjusting the front of the dividing board to any required hight by means of the double-hinged connecting pieces, Y and Z, substantially as specified.

44,895.—Hoisting Apparatus.—William Smith, Philadelphia, Pa.:

I claim the use in hoisting apparatus of the intermediate shaft, I, with its pinion, H, operated from the driving shaft by a worm and worm-wheel, in combination with the cog-wheel, G, on the hoisting drum or drum shaft.

47,896.—Seeding Machine and Cultivator.—David Stouder, Clarinda, Iowa:

I claim, first, The governing device consisting of the castor wheel, M′′, cord or chain, and driver's seat, H′′, all arranged and combined for the purpose of guiding the machine, as set forth.

Second, I claim the construction and arrangement of suspending the plough and rotating harrows suspended obliquely across the frame while at work, as herein specified.

44,897.—Circular Saw-mill.—P. D. Shaw, Carson City, Nevada Territory:

I claim the belt-tightner formed or constructed with the two pulleys, P P′, arranged as shown, in connection with the two belts, E H, and cross-belt, L, all arranged with the saw shaft, G, and shaft, B, to operate substantially as and for the purpose set forth.

44,898.—Apparatus for amalgamating Gold and Silver. Jacob J. Storer, Boston, Mass.:

I claim, first, Giving the "pulp," by any suitable mechanism, a circulating motion so that it shall constantly return and pass over the same points until exhausted of its gold or silver, substantially as described.

Second, The employment of an axle or axles furnished with rods, blades, interlaced wires, or perforated plates, so arranged as to form a spiral or a paddle wheel, and made to revolve in a suitable sluice or sluices, so as to dip into the quicksilver at the bottom, substantially as and for the purpose described.

Third, I claim the wheel, C, or its equivalent, with blades, rods, wire, etc,, of copper, or other metal not liable to be destroyed by the action of mercury, but capable of surface amalgamation in combination with the sluice, S, or sluices, s s′, substantially as described.

Fourth, I claim the combined sluices, s s′, lined with copper or other metal capable of surface amalgamation, arranged and operating substantially as herein set forth.

44,899.—Chain for Ornament.—Lauriston Towne, Providence, R. I.:

I claim the improved ornamental chain, shown and described, when composed of links of the form and structure, substantially as herein specified.

44,900.—Cylinder Coal Stove.—Wm. B. Treadwell, Albany, N. Y.:

I claim, first, A supply cylinder coal stove or base burner, which is

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constructed with ascending flues passing through the upper portion of the stove, and descending flues passing down through the lower portion of the stove, in conjunction with an appliance which shall admit of the escape of gas from the upper section of the stove into the exit flue, substantially as described.

Second, The application of a perforated valve or damper, G, or its equivalent, to a base burner having ascending and descending flues, substantially in the manner described.

Third, Constructing the fire-pot, C, with a lipped projection or projections, substantially as and for purposes set forth.

Fourth, So constructing the fire-brick lining that those portions thereof, which cover the arched openings through this lining, shall serve to protect said openings from filling up with coal, substantially as described.

Fifth, The combination of a lipped fire-pot, constructed substantially as described, with fire-brick lining having arched openings or flues through it, substantially as described.

44,901.—Rotary Engines.—George Vining, of Boston, Mass.:

I claim, first, The combination of the piston, traveling in one and the same circular path in a suitable steam chamber, and a disk moving at right angles thereto, in such a manner and so constructed as to furnish a steam abutment to and permit the passage through it of the said piston, substantially as described.

Second, The combination and arrangement of the disk and steam drum, so operating together that the rotary movement given to the said drum and disk shall be such as to permit the ingress and egress of the steam to and from the steam cylinder at the proper times, and also present a steam abutment to the piston, as set forth.

44,902.—Circular Looms.—William H. Walton, of New York City, and Ellen S. Nandam and Arnold Nandam (administrators of Andrew Nandam, deceased) of West Farms, N. Y.:

We claim, first, The combination and arrangement of the shuttle, K, with the pulleys, L M H and I, the rings of the flanges, J and N, and the revolving table, G, substantially as and for the purpose set forth.

Second, The combination and arrangement of the heddles, Y, the rollers, T, and the stationary reed, C''', with the stud, V, the cam, U, and the revolving table, G, substantially as and for the purpose set forth.

Third, The combination and arrangement of the reed comb, D', the arm, S, the support, S', the rod, R, and the pulley, R', with the frame or table, S'', the groove, P', and the cam, P, substantially as and for the purpose set forth.

Fourth, The combination and arrangement of the revolving table, G, with the cams, P and U, the central column, A, and the geer, F, substantially as and for the purpose set forth.

44,903.—Machine for Grinding and Polishing Saws.—J H. Weaver, of Waynesville, Ohio:

I claim the rotary wheel, F, with grinders or polishers, G, attached, in combination with the boxes, C, provided with the adjustable beds, D, on which the saws are placed, all being arranged to operate in the manner substantially as and for the purpose herein set forth.

44,904.—Stop-cock Cases.—James G. Weldon, of Pittsburgh, Pa.:

I claim a stop-cock case, so constructed that it shall retain the stop cock in a central upright position within it, whether the body of said case be made in one or more pieces, substantially as described.

44,905.—Breech-loading Ordnance.—William Williams, of St. Louis, Mo. Ante-dated Aug. 7, 1862:

I claim the chamber, a, breech pin, e, and India-rubber block, d, arranged in the breech of the gun, and in respect to each other, in the manner described, the whole to be constructed as set forth.

44,906.—Roasting and Desulphurizing Ores.—Riley P. Wilson, of New York City. Ante-dated Oct. 5, 1864:

I claim, first, Conducting ores in a retort through a furnace, and stirring and grinding them in the passage by means of a screw shaft and elevators, G, in the manner substantially as described, and for the purposes set forth.

Second, The regrinding to an impulpable powder the desulpherized material in a dry state, when such material is what is termed the tailings of quartz mines or other previously pulverized quartz, after being desulpherized.

Third, Conveying in a flue, D, from the retort, the gases evolved from the ores by the heat, and causing thereby a supply of air to take their place, by means of the furnace draught.

44,907.—Fastening Bags, Sacks, &c.—Abner Brownell Wood, Jr., of Ovid, Mich. Ante-dated June 26, 1864:

I claim the iron ring, A, plug, B, tapering key, C, and screw, D, combined and arranged, substantially as described.

44,908.—Carriage Springs.—E. M. Wright, of Wyandot, Kansas:

I claim the combination of two or more elliptic springs, connected at their ends by free joints, as described, so that the inner, auxiliary spring shall begin to act only when the outer spring shall have been pressed down to a certain extent, substantially as and for the purpose herein specified.

44,909.—Friction Brake for Power Sewing Machine.—Jacob Zuckerman, of San Francisco, Cal.:

I claim the combination and arrangement of the bent arm, P, and pad, h, with the slide, e, notches, i, and spring pawl, g, operating substantially in the manner and for the purposes described.

44,910.—Manufacture of Leather Cloth, Imitation Leather, etc.—Nicholas Charles Szerelmey, of Clapham Common, Eng. Patented in England Jan. 1, 1862:

I claim the use of the substance called zopissa in the manufacture of leather cloth or imitation leather and in rendering linen, woolen and cotton fabrics water-proof.

I also claim as my invention the compositions as above-described, and the mode of making leather cloth or imitation leather, above described.

44,911.—Sizing Rolls for Cotton Machinery.—John M. Dunlop. of Manchester, Eng., assignor to himself and Frederick and Francis Curtis, of Newton, Lower Falls, Mass. Patented in England June 7, 1858:

I claim the improved roll, made as above described, that is with a metallic or other suitable body or shaft, and an outer covering of vulcanite or hard rubber, or its equivalent, substantially in the manner and for the purpose hereinbefore set forth.

44,912.—Stopper for Bottles.—Albert Albertson (assignor of J. N. McIntire) of New York City:

I claim a stopper constructed and adapted to operate within a bottle, substantially as described.

44,913.—Trusses.—Edmund P. Banning, of New York City:

I claim, first, The scolloped front pad or plate, E E2 E3, in the described combination, with inguinal pads, e3 e3, attached by separate springs to the main spring, B, and occupying the scollops in the plate, E, all substantially as herein described.

Second, In combination with the scolloped front pad or plate, E, and inguinal pads, e3 e3, I claim the extensible springs, e9 e9, constituting adjustable attachments for the said inguinal pads, independent of the attachment of the plate, E.

Third, I claim the combination of the main spring, B, front pad or plate, E, and femoral-herma pad, F F', constructed and adapted substantially as herein specified.

Fourth, I claim attaching the respective ends of the front pad or plate, E, by independent springs, so as to admit of changing the hight of either, and of said plate without affecting the other end.

Fifth, I claim making the extension springs which are attached by loops to the main spring, with slots working easily on guide pins or otherwise, so as to automatically extend and contract by the motion of the body, and become adjusted in length with the surface on which they impact, conforming in length to the linear extension due to the flexure of the body, and rendering the instrument relatively permanent while the attachment is adjustable.

44,914.—Body Braces.—Edmund P. Banning, of New York City.

First, I claim the shoulder bow, D, and pads, D', constructed and adapted to flatten the scapulae and roll back the shoulders, in the manner explained.

Second, In combination with the aforesaid shoulder bow, constructed and operating as specified, and with the main spring, B B, I claim the lever, A, for attaching and supporting the shoulder bow, D, and pressing forward the spine, as explained.

Third, In combination with the aforesaid shoulder bow, D, and with the main spring, B B, I claim one or more side posts, K K', for relieving tender diseased spines, as explained.

44,915.—Turning Lathes.—John G. Baker (assignor to himself, Thos. S. Disston and Thos. H. Asbury), of New York City:

I claim the combination of the worm wheel, G, dial, H, index, I, screw, C, and slide, D, constructed and operating substantially as and for the purpose set forth.

44,916.—Lasting Machines.—Wm. E. Fischer, of Boston, Mass., assignor to Alfred B, Ely, of Newton, Mass.:

I claim the application of rubber or other equivalent elastic cheeks or linings to the jaws or clamps of lasting machines, substantially as and for the purposes described.

44,917.—Apparatus for Feeding Paper to Printing Presses.—John Hunt, (assignor to himself and Geo. D. Sharp) of New York City:

First, I claim the suction devices, n, and retaining clamp, E, for the purpose of guarding against feeding too many sheets at once, as herein set forth.

Second, I claim the reciprocating plate or divider, d, and friction device, G, or its equivalent. arranged relatively to the lifting device, m, so as to require a simply vertical motion of the latter, substantially in the manner and for the purpose herein set forth.

Third, I claim, in combination with a paper feeding machine, a table motion, composed of the widely-separated teeth. b2, wheel, Q1, pawl, R, and the chain and lever, P and O, or their equivalents, arranged substantially in the manner and for the purpose set forth.

Fourth, I claim the accordion-like mechanism, composed of the parts, N V', and W W', or their equivalents, hinged together and adapted to guide the motion and compel the horizontal portion of the table, L, substantially in the manner and for the purpose herein set forth.

44,918.—Emery Wheels.—Thomas Nelson, of West Troy, N. Y., assignor to New York Quartz Company, of New York City:

I claim manufacturing wheels, slabs, rings, or other grinding articles or surfaces of the composition, and substantially in the manner specified.

44,919.—Reefing Apparatus.—Algernon Robert Tiffin, of New Haven, Conn., assignor to Charles Rousha, of Providence, R. I.:

I claim the jack stay, c, the reef points, g, and the pennants, h, arranged in relation to each other and to the yard, d, and sail, B, substantially in the manner described, for the purpose specified.

44,920.—Corn Planter.—Joseph Olmsted (assignor to himself and John H. Lewis), of Knoxville, Ill.:

I claim, first, The arrangement of the gearing, I N b b c' g h, and shafts, J J O, and axle, C, substantially as shown and described, for the purpose of varying the speed of the rotary markers, G, relatively with the wheels, B B', substantially as and for the purpose specified.

Second, The bars, U, slotted at their upper ends, and fitted within the spouts, V, and seed boxes, T, as shown, in combination with the elastic plates, W, all arranged to operate in the manner substantially as and for the purpose set forth.

Third, The attaching the rear ends of the coulters, D', to the shares, C', by means of the lips, b*, and pins, c*, substantially as and for the purpose described.

Fourth, The levers, R, with the bearings, K K, attached to slotted slide, I, operated by means of lever, M, substantially as and for the purpose described.

Fifth, Lever, S, attached to bar, d, in combination with the spring, Q, and bearing, P, substantially as and for the purposes described.

[This invention relates to a new and improved machine for planting corn in check rows, direct or without any previous furrowing of the ground, and it consists in attaching rotary markers to the axle, and arranging the same in connection with gearing, and independently of the wheels of the machine, in such a manner that the markers may, as the machine is drawn along, be made to give or loose, as may be required, in order to compensate for the inequalities of the ground, and insure the seed being dropped evenly in check rows.

44,921.—Artificial School Slates.—Charles and Henry Volkmar (assignor to Charles B. Steinbach), of Baltimore, Md.:

We claim an artificial slate, having for its base pasteboard, which is prepared and created, substantially in the manner and for the purpose herein described.

We also claim the application of a mixture of benzine or spirits of turpentine, japan, emery flour and coloring material in the manufacture of artificial slate, substantially in the manner and for the purposes described.

44,922.—Boiler Feeders.—C. H. Wheeler (assignor to himself, Richard Hadden, Robert Tuttle and P. D. Beckwith), of Dowagiac, Mich.:

I claim the apparatus constructed as herein described, for maintaining a constant level of water in steam boilers at all times, as far as practicable; this apparatus being applied to the outside of the boiler, and communicating with the water and steam spaces of the boiler chamber, and also with a supply reservoir, and operating substantially as set forth.

44,923.—Band Ruffles.—George H. Wooster (assignor to E. C. Wooster), of New York City:

I claim the within-described band-ruffling, composed of a plaited or gathered strip and a double band, having the said strip inserted into and between opposite portions of it, and having its edges turned inward, such strip and band being united by a single row of stitching, which also serves the two other purposes of securing the plaits or gathers, and of securing the turned-in edges of the band.

RE-ISSUES.

1,803.—Suspended.

1,804.—Metal Cans, Cases, Boxes, Etc., for Preserving Food, Paints, Oils and other substances.—Moritz Pinner, of New York City, assignee of Jean Bouvet, of La Rochelle, France. Patented June 28, 1864:

I claim the manufacture and use of metal boxes, cans, cases and other vessels hermetically sealed or closed, substantially in the manner herein described, so that they may be opened by means of a pair of pincers, a key or other like contrivance, operating in the same way, without the necessity of cutting the cam or cover, as set forth.

I claim the free end, c, of the wire, C, or its equivalent, operating in the same way, in combination with the top, cap or any other part of a hermeically-sealed can, box or other vessel, for the purpose of starting the opening of such can, box or other vessel when required.

I claim inserting or soldering in the top of a preserve can or box, or in any other part of such can or box or in any other hermetically-sealed vessel, in which an opening is to be made, a wire, C, or its equivalent, of any suitable shape and length, with a protruding part, c, so that such box, can or other vessel may be opened, in the manner, substantially as herein set forth and described.

1,805.—Sewing Machine.—The Union Buttonhole Machine Company, of Boston, Mass., assignees of Kasimer Vogel, of Chelsea, Mass., Patented Oct. 4, 1859:

I claim, in combination with the needle which carries its thread through the cloth, combined with suitable means below for concentrating the stitches to form a seam within the edge, or what is to be the edge, the employment of the thread which passes over the edge to make the edge finish, with the seam within the edge, substantially as described and for the purpose set forth.

I also claim the employment of a guide or guides for introducing and laying a thread or cord, termed a bar, on one or both surfaces of the material, parallel with the seam, and under the connecting thread or threads, substantially as described, in combination with the sewing mechanism, or the equivalent thereof, and the mechanism, or the equivalent thereof, for passing the thread or threads over and across said bar or bars, substantially as described.

EXTENSION

Steam Boilers.—Richard Montgomery of New York City. Patented Oct. 29, 1850:

I claim the employment of corrugated plates of metal for forming the curved arches of fine chambers and shells of steam boilers, the corrugations running in the direction of the curves, substantially as described.

Steam Cutters.—A. S. Macomber, of Bennington, Vt. Patented Nov. 5, 1850:

I claim the application and use of rotary spiral cutters, D D, which are self-feeding, in combination with a stationary knife, or cutting edge, in the manner and for the purpose substantially as described.

PATENTS

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In connection with the publication of the SCIENTIFIC AMERICAN, have acted as Solicitors and Attorneys for procuring "Letters Patent" for *new inventions* in the United States and in all foreign countries during the past *seventeen years*. Statistics show that nearly ONE-THIRD of all the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after *seventeen years'* experience in preparing specifications and drawings for the United States Patent Office, the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office; but they take pleasure in presenting the annexed testimonials from the three last ex. Commissioners of Patents:

MESSRS. MUNN & Co.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours very truly,

CHAS. MASON.

Judge Mason was succeeded by that eminent patriot and statesman, Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very ratifying letter:

MESSRS. MUNN & Co.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,

J. HOLT

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & Co.:—It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, your obedient servant,

WM. D. BISHOP.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

As an evidence of the confidence reposed in their Agency by inventors throughout the country, Messrs. MUNN & CO. would state that they have acted as agents for more than TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees, at home and abroad. Thousands of inventors for whom they have taken out patents have addressed to them most flattering testimonials for the services rendered them; and the wealth which has inured to the individuals whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! Messrs. MUNN & CO. would state that they never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in their extensive offices, and that they are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service which Messrs. MUNN & CO. render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there; but is an opinion based upon what knowledge they may acquire of a similar invention from the records in their Home Office. But for a fee of $5, accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO., corner of F. and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue Address MUNN & CO., No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of Messrs. MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row New York.

Patents are now granted for SEVENTEEN years, and the Government fee required on filing an application for a patent is $15. Other changes in the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for extension of Patent	$50
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The Patent Laws, enacted by Congress on the 2d of March, 1861,

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now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners, except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention The Government fee for a caveat is $10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

REJECTED APPLICATIONS.

Messrs. MUNN & CO. are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of their Washington Agency to the Patent Office affords them rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Their success in the prosecution of rejected cases has been very great. The principal portion of their charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with MUNN & CO., on the subject giving a brief history of the case, inclosing the official letters, &c.

FOREIGN PATENTS.

Messrs. MUNN & CO., are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business they have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. They think they can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through their agency.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through MUNN & CO'S Agency, the requirements of different Government Patent Offices, &c., may be had, gratis, upon application at the principal office, No. 37 Park Row, New York, or any of the branch offices.

SEARCHES OF THE RECORDS.

Having access to all the official records at Washington, pertaining to the sale and transfer of patents, MESSRS. MUNN & CO., are at all times ready to make examinations as to titles, ownership, or assignments of patents. Fees moderate.

INVITATION TO INVENTORS.

Inventors who come to New York should not fail to pay a visit to the extensive offices of MUNN & CO. They will find a large collection of models (several hundred) of various inventions, which will afford them much interest. The whole establishment is one of great interest to inventors, and is undoubtedly the most spacious and best arranged in the world.

MUNN & CO. wish it to be distinctly understood that they do not speculate or traffic in patents, under any circumstances; but that they devote their whole time and energies to the interests of their clients.

COPIES OF PATENT CLAIMS.

MESSRS. MUNN & CO., having access to all the patents granted since the rebuilding of the Patent Office, after the fire of 1836, can furnish the claims of any patent granted since that date, for $1.

THE VALIDITY OF PATENTS.

Persons who are about purchasing patent property, or patentees who are about erecting extensive works for manufacturing under their patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing patent, before making large investments. Written opinions on the validity of patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited. For further particulars address MUNN & CO., No. 37 Park Row New York.

EXTENSION OF PATENTS.

Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that very many patents are suffered to expire without any effort at extension, owing to want of proper information on the part of the patentees, their relatives or assigns, as to the law and the mode of procedure in order to obtain a renewed grant. Some of the most valuable grants now existing are *extended patents*. Patentees, or, if deceased, their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention

Patents may be extended and preliminary advice obtained, by consulting or writing to MUNN & CO., No. 37 Park Row, New York.

ASSIGNMENTS OF PATENTS.

The assignment of patents, and agreements between patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

UNCLAIMED MODELS.

Parties sending models to this office on which they decide not to apply for Letters Patent and which they wish preserved, will please to order them returned as early as possible. We cannot engage to retain models more than one year after their receipt, owing to their vast accumulation, and our lack of storage room. Parties, therefore, who wish to preserve their models should order them returned within one year after sending them to us, to insure their obtaining them. In case an application has been made for a patent the model is in deposit at the Patent office, and cannot be withdrawn.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid) should be addressed to MUNN & CO. No. 37 Park Row, New York.

Notes and Queries

H. P. T., of Tenn.—We know of no book containing full directions for constructing apparatus for distilling coal tar. We understand there is an establishment in Louisville. A still is used and the sediment is drawn off before it becomes too stiff to run. It is said that the best results have been obtained by letting steam into the still. Perhaps Professor Charles A. Seely, No. 244 Canal street, this city, may give you some further particulars.

E. L., of N. J.—Dana's Mineralogy stands at the head of works on this subject, but Comstock's of 1850 is a safe guide. Webster's Unabridged Dictionary gives the pronounciation of many proper names. Lavoiser is pronounced Lavwasea, Thenard Taynar; the others about as written. We will devote an article soon to answering your question, "What is a Rhumkorff coil?" Gold pens are pointed with a native alloy of irridium and osmium, called irridosmium.

T. W. S., of N. H.—An artificial grindstone can be made by the following formula, although the natural one is cheaper and better; washed silicious sand 3 parts, shell lac 1 part, melt the lac and mold in the sand while warm. Emery may be substituted for sand. Used for razors and fine cutlery.

C. B. M., of Mass.—A gold powder according to "Cooley," is made by rubbing gold leaf with sulphate of potassa in crystals, the latter is afterward washed out. Another gold powder can be made by rubbing gold leaf on a marble slab with honey or molasses, and afterward washing out the molasses when the gold will sink to the bottom.

R. A. L., of Wis.—Pencil drawings are preserved by pouring skim milk over the surface. A yellow tone can be given to the paper by a decoction of coffee.

T. W., of Ohio.—Butyric acid is an oily acid obtained from butter. Butter for cooking may be preserved a long time by melting it and pouring it into an earthen pot.

H. A. C., of Pa.—Combination type have been used in this city for a long time by a Mr. Tobitt. Printer's generally see no advantage to be derived from them. There is moreover a loss for if one letter of any combination gets battered the whole number are lost.

S. G. G., of Pa.—Steel belts are used on one of the steep inclines at the great coal depots in Pennsylvania. They are also used in the form of belt saws. We do not know where you can procure one, neither do we see any special advantages to be derived from them.

V. & M., of Pa.—Address N. C. Stiles, West Meriden, Conn., for a punching press, for description of press see page 305, Vol. X, SCIENTIFIC AMERICAN.

J. F. C., of N. Y.—We know of no work containing more minute information in regard to galvanizing iron than that which we have published. The fair of the American Institute last year did not pay; probably because they had no running machinery.

S. J. L., of Vt.—H. C. Baird, 406 Walnut street, Philadelphia, is a publisher of industrial works of every character under the sun, and we refer this correspondent and dozens of others who write to us for information, to him for books they may want.

Persons who have sent us descriptions of their bread-slicers should have sent them to the correspondent who inquired for the machine. They will not reach him through us.

J. T. D., of Ill.—It will depend upon the character of the article. If not too long it will be acceptable, though the subject does not appear to be one of general interest.

Mr. G. Laflamme of Montreal, C. E., wishes to obtain a good quartz crusher.

A. S. C., of N. J.—All matter in the universe is in motion. Inertia is the resistance offered by matter to any change either in the velocity or direction of its motion.

M. D., of Canada East.—The curve described by a point in the circumference of a rolling wheel is not a section of a circle, but a cycloid.

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, Oct. 26, 1864, to Wednesday Nov. 2, 1864:—

R. T., of N. Y., $20; S. & B., of Ohio, $20; G. F. M., of Ohio, $20; B. & G., of N. Y., $20; S. & C., of N. Y., $15; W. L., of Md., $45; G. A. McC., of N. Y., $15; G. N. J., of Wis., $45; J. H. Jr., of Mich., $45; A. B., of N. Y., $15; D. J. M., of Cal., $25; B. C., of N. Y., $15; S. E. T., of N. J., $25; S. G., of Tenn., $16; H. K. W., of Vt., $15; S. T. S., of Ky., $16; L. O. B., of Ind., $25; J. J., of Md., $40; J. S., of N. Y., $16; W. W. H., of Cal., $15; J. H. G., of N. Y., $219; T. M., of N. Y., $25; A. E., of Ohio; $16; F. & W., of N. Y., $25; J. W., of N. Y., $15; G. McK., of N. Y, $20; W. G. B., of Mass., $45; J. P., of Ill. $20; E. H., of N. Y., $20; D. J. S., of N. Y., $20; T. L., of Conn., $45; J. & B., of Mass., $45; D. M. A., of N. Y., $45; J. B. R., of N. Y., $45; C. H. M., of N. Y., $10; W. T. H., of Maine, $15; J. G., of Md., $22; E. H., of Ill., $25; D. & Z., of Ill., $15; H. W. B., of N. Y., $15; J. R. of Ind., $25; J. B., of Ill., $15; W. B., of Iowa, $25; A. M. O., of Ill. $15; J. L. R., of Ohio, $15; I. W., of Mass., $12; Y. F., of Mass., $30; S. E. T., of N. J., $25; A. P., of N. Y., $22; J. S., of Conn., $20; T. H., of N. Y., $18; A. A., of N. Y., $15; E. L. P., of Pa., $45; D. F. H., of Mass., $20; M. W., of N. Y., $20; J. S. T., of Pa., $20; H. K. A., of N. H., $20; E. N. K., of N. Y., $20; S. & L., of N. J., $15; P. L., of N. Y., $15; J. F. D., of N. Y., $15; J. W., of Ind., $20; D. L. M., of N. J., $15; J. N. B. J., of Mass., $20; A. L., of N. Y., $15; W. T., of N. Y., $45; E. S. D., of Vt., $15; J. N. P., of N. Y., $16; F. L., of Ohio $25; J. F. L., of Mich., $25; P. C., of Ill., $16; L. D. H., of Ill., $15; D. C. H., of Pa., $16; W. Z. S., of Nevada, $20; R. K., of Ill., $16; C. H. R., of Maine, $15; J. W. P., of Ill., $25; W. & S., of Germany, $75; B. McG., of N. Y., $30; S. & L., of N. Y., $25; E. H., of Ind., $15; J. W. E., of Pa., $30; A. K B., of N. Y., $25; E. E. S., of U. S. N., $20; S. G., of N. Y., $16; C. W. W., of Vt., $45; H. C. R., of Ill., $45; M. P., of N. J., $10.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, stating the amount and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office, from Wednesday, Oct. 26, 1864, to Wednesday, Nov. 2, 1864:—F. & W, of N. Y.; I. F. B., of Conn. (2 cases); T. L., of Conn.; S. E. T., of N. J.; S. & L., of N. Y.; J. P. N., of N. J.; J. W. P., of Ill.; J. R., of Ind.; W. W. H., of Cal.; T. M., of N. Y.; H. W. B., of N. Y.; J. B., of Ill.; S. E. T., of N. J.; W. G. B., of Mass.; J. B. R., of N. Y.; A. B., of N. Y.; H. J. H., of N. Y.; V. F., of Mass.; L. O'B., of Ind.; W. B., of Iowa; J. F. L., of Mich.; W. Y. C., of Cal.; S. T., of Ill.; J. W. E., of Pa.; E. K., of N. Y.; A. P., of N. Y.; T. H., of N. Y.; W. T., of N. Y.; B. McG., of N. Y.; W. S. T., of N. J.; I. W., of Mass.; J. J., of Md.; J. M. H., of Ind.; H. & R., of Cal.; F. L., of Ohio; E. H., of Ill.; A. R. B., of N. Y.

TO OUR READERS.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

MODELS are required to accompany applications for Patents under the new law, the same as formerly, except on design patents, when two good drawings are all that are required to accompany the petition, specification and oath, except the Government fee.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgement of our reception of their funds.

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VOLUMES III., IV., VII., AND X., (NEW SERIES) complete (bound) may be had at this office and from periodica dealers. Price, bound, $2 25 per volume, by mail, $3—which includes postage. Every mechanic, inventor or artisan in the United States should have a complete set of this publication for reference Subscribers should not fail to preserve their numbers for binding VOLS. I., II., V., VI. and VIII. are out of print and cannot be supplied.

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TWENTY-FIVE CENTS per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published we will explain that ten words average one line. Engravings will not be admitted into our advertising columns, and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable

MCKEAGUE'S PATENT BOX-OPENERS.—ORDERS for this highly useful and popular tool, of which a cut and description appeared in this paper on the 18th day of June last, may be sent to H. C. CANDEE, Agent, 77 John street, New York. 1*

WANTED.—A PERSON WITH FROM $10,000 TO $15,000 capital to enlarge a new and very profitable business. The only one of the kind in this country now in full operation. Address FREDERIC S., 30 Amity street, New York. 1*

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A proper guaranty must accompany all proposals, setting forth that if a contract is awarded to the party named therein he or they will at once give bonds for faithful performance of a contract.

The United States reserves the right to relect any part or the whole of the bids as may be deemed for the interests of the service.

Proposals should be endorsed "Proposals for (here insert the nature of the bid") and addressed to

1 COL. D. H. VINTON, D. Q. M. Gen., U.S.A.

PATENTEES AND OWNERS OF INVENTIONS WHO desire them negotiated in Europe, are invited to call on or address the subscriber, who has the best facilities for effecting sales. J. M. EMERSON, Room No. 6, 83 Nassau street, New York. 20 2*

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SMOKE PREVENTION AND ITS FALLACIES.—Smoke-burning furnaces, Universal "Argand" fire-grate, Report on Williams's smoke-burning furnace, Experiments on smoke-prevention, Theory of the best combustion in steam engine furnaces

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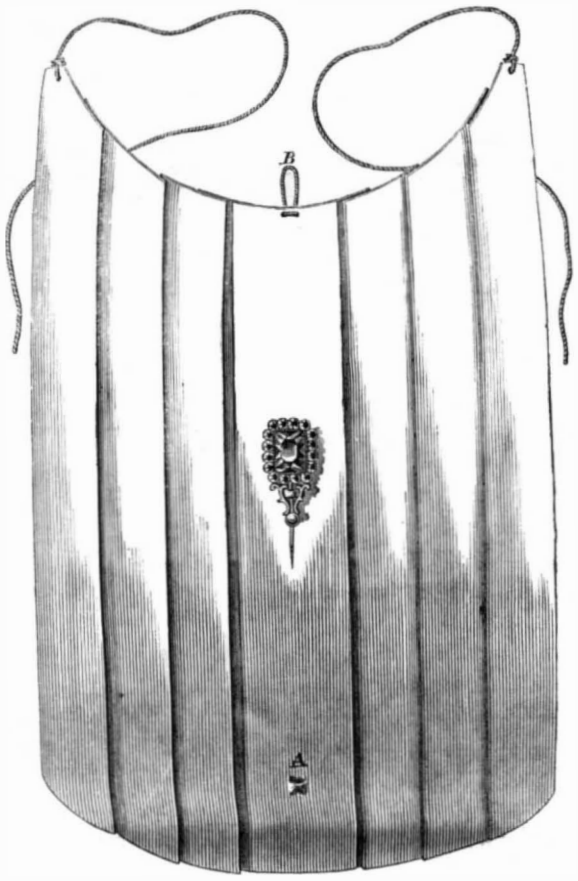

BRADY'S METALLIC SHIRT FRONT.

Manufacture of Articles from Cast-iron.

Mr. Neil McHaffie, of Glasgow, claims the making of castings of white hematite, or the mixture of this with mottled or grey, and very gradually cooling the said casting in an oven or furnace, the molds being placed therein and heated before the metal is poured in, or the castings being produced, out of the furnace, and afterwards placed therein. The invention is applicable more especially to the manufacture from cast-iron of articles which are required to combine great toughness with considerable or great hardness, as, for example, projectiles (suitable for the penetration of armor plates), plates, and slabs for batteries, dies of large size for stamping metal, and many other articles. He takes cast-iron of a very hard nature, by preference white hematite pig, or a mixture of this with mottled or grey hematite pig, which if cast in the ordinary manner would be too hard to be conveniently cut and worked. For many classes of castings it is found that all white pig may be used, whilst in other cases more or less of the mottled or grey pig may be mixed therewith, and still produce castings of the requisite hardness. He has found a mixture of two parts of white and one part of mottled hematite pig to be a good working mixture. This metal he casts in a mold of fire-clay or other material, which is kept heated in a furnace to a red heat, or hotter. A mold of sand, mixed with a little lime, he finds suitable for many purposes. The metal is run nto the mold, and is gradually cooled down in the furnace, the cooling being made to occupy from thirty hours to seventy-two hours, or longer, for very large sizes. The gradual cooling of the metal ensures uniformity of structure throughout the mass. Afterwards, although the metal is still hard, it can be turned and shaped, if necessary. If greater hardness be required, the article (after turning and shaping, if these processes are resorted to) may be hardened by reheating and plunging, as is practised when hardening steel. The hardness, also, may, if required, be afterwards adjusted by a process of tempering, as is practised with steel. The furnaces or ovens may be made of any convenient forms, and the heat, by preference, used for the harder mixtures—that is, with most white pig in the mixture—is from a full red to nearly a white heat, or even higher, and for the softer mixtures from a full red heat down to a red heat. Castings from similar mixtures may be made in the usual way, either in dry sand, green sand, or loam molds, but instead of letting them cool in the usual way they are taken out of the mold as soon after solidifying as possible, and placed in the furnaces or ovens, heated as before mentioned, and then left gradually to cool, as in the former case. This process does not usually produce such good results as pouring the metal whilst the molds are in the furnace or oven, but is sometimes more convenient.

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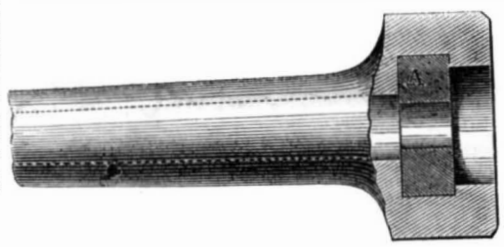

mule, to be stopped for half a day or more to be packed, or have the spindles wound, in order to retain the bobbins upon them. As there is no elasticity to this packing, constant breakage of the bobbin ensues by careless and hurried crowding upon the spindle, thus making a great waste of bobbins, and also the stock upon the broken bobbin, which is invariably thrown to waste. A spring or catch is also necessary to hold the bobbin into the shuttle, and these springs or catches are constantly out of order, while the yarn tangling in them entails additional loss. It is claimed for this bobbin that the elastic substance, A, in it, effectually retains its hold upon the spindle; doing away entirely with any packing. The bobbins will last much longer, make less waste on the jack, and dispense with all springs or catches in the shuttle. There has been probably no invention of the age so simple, which makes so much saving to manufacturers of time, labor, and stock. As this article is largely used in cotton mills, anything tending to make it more durable will no doubt be acceptable to manufacturers. It was patented through the Scientific American Patent Agency on Aug. 30, 1864, by C. H. Reynolds, of Wickford, R. I., of whom all further information can be obtained.

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